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PROPELLANT SURVEILLANCE REPORT, LGM-30 F & G STAGE I, PHASE G, --ETC(U)
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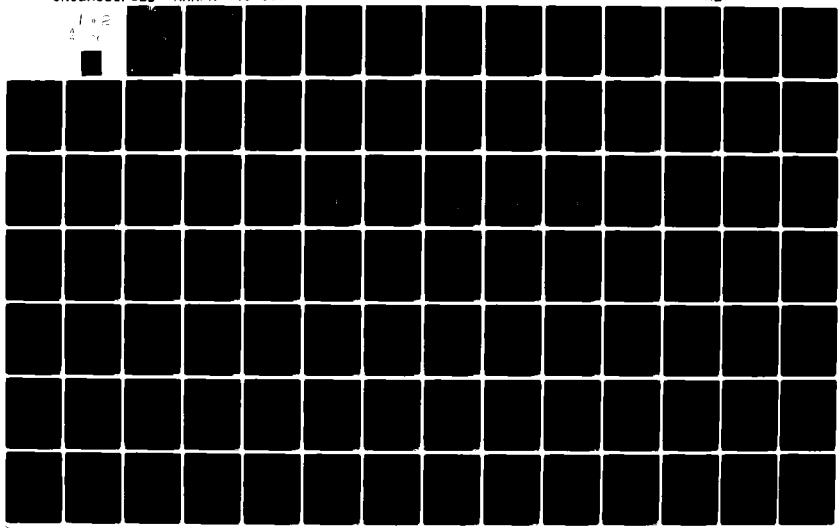
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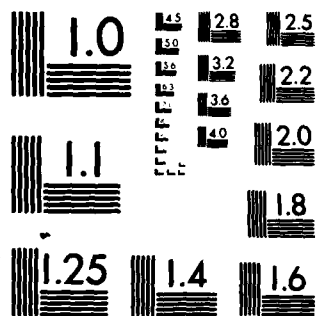
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OGDEN AIR LOGISTICS CENTER

UNITED STATES AIR FORCE

HILL AIR FORCE BASE, UTAH 84056

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PROPELLANT
SURVEILLANCE REPORT
LGM-30 F&G STAGE 1
PHASE G, SERIES I
TP-H1011

See 11/13 for info.

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PROPELLANT ANALYSIS LABORATORY

MAKPH REPORT

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OCTOBER 1980

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MAKPH REPORT NR 445 (80)
MAMREM PROJECT MD4046C-WNL0529

PROPELLANT SURVEILLANCE REPORT
LGM-30 F & G STAGE 1 (TP-H1011)

2

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ABSTRACT

This report contains propellant test results from cartons of TP-H1011 bulk propellant representing LGM-30 F and G First Stage Minuteman Motors. This report uses a statistical approach to analyze the bulk carton propellant data. Testing was accomplished in accordance with MMWRBM Project MO4046C-WNL01529.

The data from this test period are combined with data from previous testing and entered into the G085 Computer for storage, analysis and regression analysis. From the statistical analysis of all data tested to date (fourteen and one-half years for F & G), significant degradation of the propellant does not appear likely for at least two years past the oldest data point.

Each point on the regression plot represents the mean of all samples at that particular age. The number of samples at each point is indicated on the sample size summary sheet on the page accompanying each regression plot or group of regression plots. The data range at any age can be found by suitable inquiry of the G085 system.

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29B	Zero Time Test Results	29 Jan 64
29C	Zero Time Test Results (Supplement 1)	30 Mar 64
29D	Zero Time Test Results (Aft Closure)	9 Jun 64
29E	Zero Time (Aft Closure Supplement 1)	24 Jun 64
29F	ATP Phase I Test Results	30 Mar 65
29G	ATP Phase I Test Results	19 Aug 65
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32A	Zero Time, wings II-V Test Results	17 Mar 65
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32C	ATP Phase I, wings II-V Test Results	3 Nov 65
49	ATP Phase I, wings II-V (First Group)	18 Mar 66
53	ATP Phase I, wings II-V (Second Group)	22 Apr 66
55	ATP Phase I, wings II-V (Third Group)	29 Apr 66
58	ATP Phase I, wings II-V (Fourth Group)	6 May 66
61	ATP Phase I, wings II-V (Fifth Group)	10 Jun 66
66	ATP Phase I, wings II-V (Sixth Group)	22 Jul 66
76	ATP Phase II, Wing I Test Results	24 Jan 67
78	Zero Time, wing VI Test Results	3 Feb 67
104	ATP Phase I, wing VI (First Group)	12 Oct 67
118	ATP Phase II, wings II-V (First Group)	5 Mar 68

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126	ATP Phase II, wings II-V (Second Group)	11 Apr 68
130	ATP Phase II, wings II-V (Third Group)	3 May 68
162	ATP Phase I, Wing VI (Second Group)	30 Sep 69
176	ATP Phase II, Wing VI (First Group)	15 Apr 70
181	ATP Phase III, Wing I	7 May 70
185	ATP Phase I, Wing VI (Third Group)	22 Jun 70
195	ATP Phase III, wings II-V (Retest)	29 Oct 70
223	Surveillance Report LGM-30 Stage I (TP-H1011)	Sep 71
239	Surveillance Report LGM-30 Stage I (TP-H1011 and TP-H1043)	Apr 72
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271	Surveillance Report LGM-30 F & G Stage I Phase A Series II, (TP-H1011)	Jul 73
277	Surveillance Report LGM-30 F & G Stage I Phase A Series III, (TP-H1011)	Oct 73
280	Surveillance Report LGM-30 A & B Stage I (TP-H1011)	Nov 73
288	Propellant Surveillance Report LGM-30 A & B, Stage I, TP-H1043	Mar 74
290	Propellant Surveillance Report LGM-30 F & G, Stage I, Phase B, Series I TP-H1011	Mar 74
300	Minuteman Stage I Motor Reliability Improvement Program Surveillance	May 74

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<u>Report Nr</u>	<u>Title</u>	<u>Report Date</u>
302	Propellant Surveillance Report LGM-30 A & B Stage 1, TP-H1011	Nov 74
313	Stage 1 Propellant Surveillance Report, Propellant Containing Glacial Acrylic Acid	Oct 74
315	Propellant Surveillance Report LGM-30 F & G Stage 1, TP-H1011	Jan 75
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325	Propellant Surveillance Report LGM-30 A & B Stage 1, TP-H1011	Jun 75
328	Propellant Surveillance Report LGM-30 A & B Stage 1, TP-H1011	Sep 75
330	Propellant Surveillance Report LGM-30 F & G Stage 1, TP-H1011	Oct 75
335	Stage 1 Motor Reliability Improvement Program	Dec 75
337	Propellant Surveillance Report LGM-30 A & B, Stage 1, TP-H1043	Feb 76
339	Stage 1, New MAPO & ERL-510 Qualification	Mar 76
341	Propellant Surveillance Report LGM-30 Dissected Motors, Phase VII, TP-H1011	Mar 76

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343	Propellant Surveillance Report LGM-30 A & B, Stage 1, TP-H1011	Jun 76
345	Propellant Surveillance Report LGM-30 F & G, Stage 1 Phase B, Series III, TP-H1011	Jun 76
350	Qualification of a New MAPO Source and ERL-510 Curing Agent for Minuteman, Stage 1, UF-2121 Liner	Sep 76
351	Propellant Surveillance Report LGM-30 A & B, Stage 1, TP-H1011	Sep 76
354	Minuteman Stage 1 Motor Reliability Improvement Program Surveillance	Sep 76
358	Propellant Surveillance Report LGM-30 Dissected Motors, Phase VIII, TP-H1011	Oct 76
360	Propellant Surveillance Report LGM-30 F & G, Stage 1 Phase E, Series III, TP-H1011	Nov 76
367	Propellant Surveillance Report LGM-30 A & B, Stage 1, TP-H1011	Apr 77
370	Propellant Surveillance Report LGM-30 F & G, Stage 1, Phase E, Series II, TP-H1011	Apr 77
377	Qualification of a New MAPO Source and ERL-510 Curing Agent for Minuteman Stage 1, UF-2121 Liner	Oct 77
379	Final RIP Report, Minuteman Stage 1 Motor Reliability Improvement Program Surveillance	Oct 77
385	Propellant Surveillance Report LGM-30 A, B, F, & G, Stage 1, TP-H1043	Dec 77
388	Propellant Surveillance Report LGM-30 A & B Stage 1, TP-H1011	Jan 78
390	Propellant Surveillance Report LGM-30 F & G Stage 1, Phase E, Series IV, TP-H1011	Feb 78
392	Propellant Surveillance Report LGM-30 Dissected Motors, Phase IX, TP-H1011	Mar 78
393	Propellant Surveillance Report LGM-30 A & B Stage I, TP-H1011	May 78

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396	Propellant Surveillance Report LGM-30 F & G Stage I, TP-H1011	Jun 78
405	Propellant Surveillance Report LGM-30 F & G Stage I, TP-H1011	Oct 78
406	Propellant Surveillance Report LGM-30 Dissected Motors, Phase X, TP-H1011	Nov 78
416	Propellant Surveillance Report LGM-30 F and G Stage I, TP-H1011	Apr 79
423	Propellant Surveillance Report LGM-30 F and G Stage I, TP-H1011	Oct 79
424	Propellant Surveillance Report LGM-30 Stage I, TP-H1043	Nov 79
425	Propellant Surveillance Report LGM-30 A and B Stage I, TP-H1011	Nov 79
427	Propellant Surveillance Report LGM-30 Dissected Motors, Phase XI, TP-H1011	Nov 79
438	Propellant Surveillance Report LGM-30 F and G Stage I, TP-H1011	Apr 80

GLOSSARY OF TERMS AND ABBREVIATIONS

Aging Trend	A change in properties or performance resulting from aging of material or component
CSA	Cross Sectional Area
DB	Dogbone
Degradation	Gradual deterioration of properties or performance
E	Modulus (psi), defined as stress divided by strain along the initial linear portion of the curve.
EB	End Bonded
EGL	Effective Gage Length
em	Strain at maximum stress
er	Strain at rupture
"F" ratio	The ratio of the variance accounted for by the regression function to the random unexplained variance. The regression function having the most significant "F" ratio is used for plotting data. The ratio is also used in detecting significant changes in random variation between succeeding time points
JANNAF	Joint Army, Navy, NASA, Air Force Committee
MANCP	Propellant Lab Section at Ogden Air Logistics Center
Ogden ALC	Ogden Air Logistics Center, Air Force Logistics Command
r or R	The Correlation Coefficient is a measure of the degree of closeness of the linear relationship between two variables
Linear Regression Equation	The general form of the linear regression equation is $Y = a + bx$
Regression Line	Line representing mean test values with respect to time
S_b	Standard error of estimate of the regression coefficient

GLOSSARY OF TERMS AND ABBREVIATIONS (cont)

S_e or $S_{y.x}$	Standard deviation of the data about the regression line
S_m	Maximum Stress
S_r	Stress at rupture
Standard Deviation (S_y)	Square root of variance
Strain Rate	Crosshead speed divided by the EGL
"t" test	A statistical test used to detect significant differences between a measured parameter and an expected value of the parameter (determines if regression slope differs from zero at the 95% confidence level)
Variance	The sum of squares of deviations of the test results from the mean of the series after division by one less than the total number of test results
3 Sigma Band	The area between the upper and lower 3 sigma limit. It can be expected that 99.73% of the inventory represented by the test samples would fall within this range assuming that the population is normally distributed.
90-90 Band	It can be stated with 90% confidence that 90% of the inventory represented by the test samples would fall within this range assuming that the population is normally distributed
Significant	As used in the statistical sense, means a difference unlikely to have been the result of random sampling from some specified population.

INTRODUCTION

A. PURPOSE:

Laboratory testing has been performed for fourteen and one-half years on First Stage LGM-30 F and G Minuteman Motor propellant blocks to evaluate the effects of aging on TP-H1011 propellant. This report contains those tests conducted on propellant as instructed in MMWRBM Test Directive GTD-1C, Amendment 2, LGM-30 First Stage Operational Propellant Laboratory Testing.

Statistical analysis of the data from tests performed will provide early warning if serious degradation trends develop. Annual evaluation of the propellant provides data for input into engineering reliability analysis for service life predictions.

B. BACKGROUND:

LGM-30 F and G testing was started in 1966 with phase testing at 24 month intervals (Report Numbers 78 - zero time; 104, 162, 185-Phase I; 176, 239, 257-Phase II; 271-Phase III). Report Number 257 was the first time that LGM-30 F and G data were statistically analyzed separately from LGM-30A and B data. The present report is a continuation of testing and statistical analysis.

Zero time testing for LGM-30A, B, F and G was started as soon as possible after receipt of the propellant by MAKPH. Data from these tests were used to establish a base line for each test parameter.

The LGM-30F and G propellant test matrix (Table 1) is used to determine the number of specimens to be taken from each propellant loaf and the specific test or tests to which these specimens are to be subjected. Very low rate and low rate tensile specimens are taken on all LGM-30F and G blocks. Specimens for other physical and combustion tests are taken from every third (LGM-30F and G) block.

TABLE 1

SAMPLE PLAN

The Procedure for determining tests to be performed on propellant batch samples of LGM-30 F & G First Stage Motors are as follows:

1. Divide the USAF motor serial numbers into three groups by dividing the last three digits of each serial number by three to determine the remainder integer, e.g., $154 \div 3 = 51$ with a remainder integer of 1.
2. Use the remainder integer to enter the following matrix to determine the group of tests to be performed on the forward, middle, and aft batch samples associated with a particular motor serial number.

TP-H1011 PROPELLANT BATCH SAMPLE	GROUP MATRIX		
	GROUP I	GROUP II	GROUP III
Forward	1	2	0
Middle	0	1	2
Aft	2	0	1

Each group will receive the following tests:

TEST MATRIX		
GROUP I	GROUP II	GROUP III
High Rate Triaxial	Dynamic Response	High Rate Hydrostatic
Creep	Stress Relaxation	Sol Gel
Bi axial Low Rate	Burning Rate	DSC
TCLC	Heat of Explosion	TGA
Hardness	Pressure Time	DTA
Ignitability		Impact

NOTE: Low Rate and Very Low Rate Tensile tests are performed on all blocks.

STATISTICAL APPROACH

In order to determine aging trends for shelf/service life predictions, as directed by Service Engineering, First Stage LGM-30 F and G Minuteman TP-H1011 propellant blocks have been undergoing testing since 1966, statistically analyzed and reported on a regular test cycle by this laboratory.

The primary reason for performing statistical analysis on test data is for the detection of propellant changes due to aging that would affect motor reliability. Regression analysis was the method used to examine data and to aid in drawing conclusions about dependency relationships that may exist i.e., relationship between age versus test results.

In selecting the best fit model for the regression equation, the linear model $Y = a + bX$ was found to be the best fit model for the regression plots.

Individual data points from different time periods were used to establish a least squares trend line for the data. The variance about the regression line, obtained using individual values of the dependent variable, was used to compute a tolerance interval such that at the 90% confidence level 90% of the sample distribution falls within this interval. This tolerance interval was extrapolated to a maximum of 24 months into the future from age of the oldest motor tested. The 't' value and the significance of this statistic, which are reported for each regression model, give an indication of the "statistical significance" of the slope of the trend line as compared to a line of zero slope. When a regression slope is indicated to be significant, it should be noted that the slope of the regression line is significant from a statistical standpoint and it is an indication that a change over time is occurring, but does not necessarily mean that the indicated change in the

value obtained during testing is significant in regards to motor operational performance. In a few cases, this small change has become the apparent trend in data variance and regression line trends. However, the changes are gradual and no operational problems are expected at this time.

The data were plotted by computer. The 'y' axis is computed so that the values at one inch intervals are peculiar to the data spread of the parameter tested. Plotted data points represent means at the particular ages at which testing occurred. The number of specimens at each age point is indicated on the sample size summary sheet accompanying the regression plot. Variance at each test age can be determined by consulting the G085 data storage system.

TEST RESULTS

VERY LOW RATE TENSILE:

Very low rate regressions show a statistically significant decrease for strain at maximum stress and strain at rupture. The stresses and modulus show a statistically significant increase (Figures 1 thru 5). The trends are gradual for the respective regressions and no operational problems from the propellant are expected for at least two years beyond the last test data.

LOW RATE BIAXIAL TENSILE:

The strain at maximum stress regression shows a statistically significant gradual increase with the strain at rupture showing no statistically significant change. The stresses and modulus show a statistically significant increase (Figures 6 thru 10).

LOW RATE TENSILE:

Low rate tensile data regressions show a statistically significant gradual decrease for strains and a statistically significant increase for stresses and modulus (Figures 11 thru 15).

HIGH RATE TRIAXIAL TENSILE:

The strain at maximum stress, strain at rupture and modulus regressions show a statistically significant decrease. Maximum stress shows a statistically significant increase. Stress at rupture does not show a significant change (Figures 16 thru 20).

HIGH RATE HYDROSTATIC TENSILE:

The strains show a statistically significant decrease. The stresses and modulus show a statistically significant increase (Figures 21 thru 25).

TEAR ENERGY:

The cohesive energy shows a statistically significant decrease (Figure 26).

TENSILE SUMMARY:

The test data regressions show that the strain is gradually decreasing and the stress and modulus gradually increasing.

Based on the analysis of test data regressions, it does not appear that meaningful degradation is occurring at this time and no operational problems are expected in the propellant for at least two years beyond the last data point.

STRESS RELAXATION MODULUS:

For the 0.5% strain at -65°F, the regressions for data at 10, 50, 100, and 1000 seconds show a statistically significant gradual increase. (Figures 27 thru 30).

At -40°F, the 10, 50, and 100 second regressions show a statistically significant increase. The 1000 second regression shows no statistically significant change. (Figures 31 thru 34).

The 3% strain regressions at 20°F, 77°F, 100°F, and 180°F show a statistically significant gradual increase. (Figures 35 thru 54).

SOL GEL:

The percent extractables, density and gel swell ratio do not show a significant change. The crosslink density regression shows a statistically significant increase (Figures 55 thru 58).

CONSTANT STRAIN:

A statistically significant gradual decrease is shown for constant strain (Figure 59).

HARDNESS:

Shore A ten second hardness shows a statistically significant increase (Figure 60).

SUMMARY OF SOL GEL, TENSILE AND HARDNESS DATA:

The crosslink density, constant strain and hardness data regressions correlate with the tensile data. As the polymer continues to crosslink, the strains decrease and the stresses increase.

PRESSURE TIME:

Maximum pressure shows no significant change while time to maximum pressure shows a statistically significant gradual decrease (Figures 61 and 62).

TCLE (Thermal Coefficient of Linear Expansion):

The thermal coefficient of linear expansion for both above and below the glass transition point (T_g) shows a statistically significant gradual increase (Figures 63 and 64).

TGA (Thermal Gravimetric Analysis):

A statistically significant increase is shown for the ignition temperature (9°C rise/min), the percent weight loss at 250°C hold (12°C rise/min to hold) and the weight loss at ignition (Figures 65 thru 67).

DTA (Differential Thermal Analysis):

The endotherm and first and second exotherms show a statistically significant decrease. The third exotherm shows a statistically significant increase and the ignition temperature with no significant change (Figures 68 thru 72).

BURNING RATE:

The burning rate shows a statistically significant gradual increase (Figure 73).

DIFFERENTIAL SCANNING CALORIMETER:

The endotherm and first and second exotherms shows a statistically significant decrease. (Figures 74 thru 76).

THERMAL AND COMBUSTION SUMMARY:

The time to maximum pressure from the pressure time data and burning rate data show a correlation. In both cases, the regressions show a gradual increase in rate of reaction. The maximum pressure and DSC regressions also correlate well with each other. In both cases, a gradual decrease in energy is shown.

The ignition temperatures for TGA shows a gradual increase.

From the analyses of the regressions, no combustion problems are expected for at least two years beyond the oldest data point.

CONSLUSIONS

Fourteen and one-half years of aging at ambient temperature (77°F) has not greatly changed the properties of the propellant. Some test parameters indicate slight aging trends, but nothing that would adversely affect the operational characteristics of the rocket motor propellant.

From the statistical analysis, it does not appear that significant propellant degradation is occurring. Based on fourteen and one-half years of accumulated data, there is no reason to suspect that properties will show much change for at least two years past the last data point. Therefore, propellant reliability should not change appreciably over that time period. Since failure limits are not available for the parameters tested, this statement is based on the fact that the slope of the regression curves where statistically significant are, with few exceptions, relatively flat or close to a line of zero slope and have not changed appreciably from the last test period.

AGE (MOS)	NR SAMP	AGE (MOS)	NP SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NP SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NP SAMP
8	3	33	152	58	352	83	80	108	93	133	82
9	19	34	154	59	317	84	56	109	120	134	126
10	11	35	113	60	418	85	76	110	63	135	60
11	15	36	226	61	290	86	92	111	42	136	51
12	30	37	147	62	337	87	122	112	135	137	99
13	48	38	126	63	243	88	139	113	297	138	256
14	28	39	119	64	160	89	177	114	165	139	157
15	38	40	122	65	108	90	156	115	133	140	78
16	46	41	156	66	79	91	107	116	321	141	40
17	55	42	123	67	43	92	82	117	247	142	45
18	28	43	142	68	179	93	117	118	149	143	203
19	49	44	106	69	234	94	95	119	133	144	97
20	24	45	135	70	287	95	146	120	210	145	12
21	56	46	122	71	135	96	148	121	123	146	21
22	27	47	166	72	124	97	150	122	41	147	30
23	67	48	177	73	110	98	159	123	44	148	40
24	55	49	199	74	152	99	141	124	45	149	12
25	63	50	188	75	198	100	162	125	84	150	27
26	47	51	347	76	147	101	136	126	53	151	51
27	50	52	314	77	167	102	51	127	107	152	9
28	56	53	295	78	91	103	68	128	60	153	8
29	40	54	232	79	117	104	84	129	75	154	27
30	73	55	474	80	113	105	32	130	104	155	15
31	88	56	461	81	155	106	11	131	212	156	23
32	153	57	392	82	178	107	21	132	156	157	12
										158	21
										159	28
										160	9
										161	33
										162	18
										163	9
										165	9
										166	18
										167	20
										169	18
										171	3
										172	2

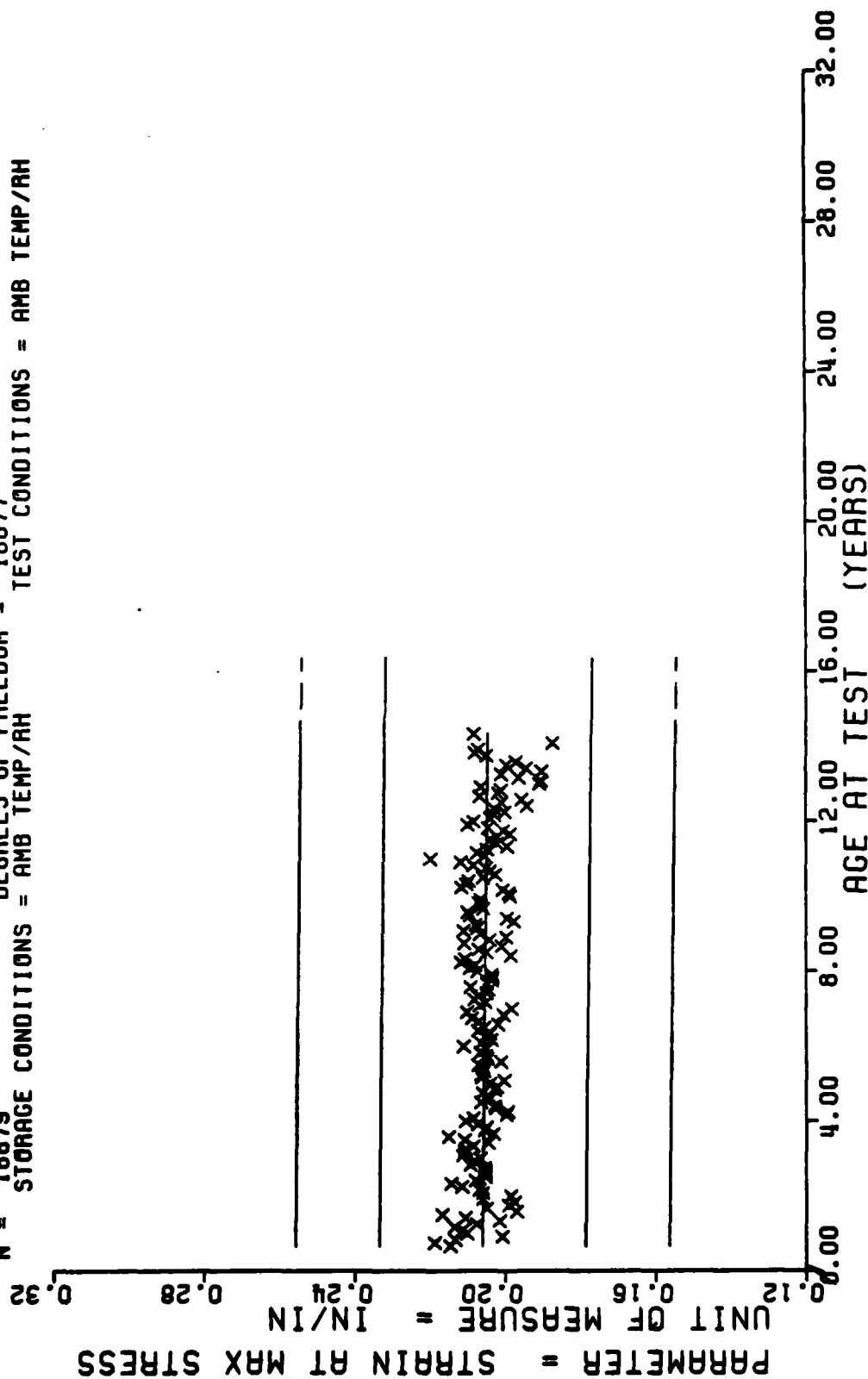
WING 6.V.L.F.TENSILE STRAIN AT MAX STRESS.CFS=0.002 IN/MIN TC=01011

This sample size summary is applicable to figures 1 thru 4

WING 6,V.L.F.TENSILE,STRAIN AT MAX STRESS,CFS=0.002 IN/IN TD-H1011

This sample size summary is applicable to figures 1 thru 4

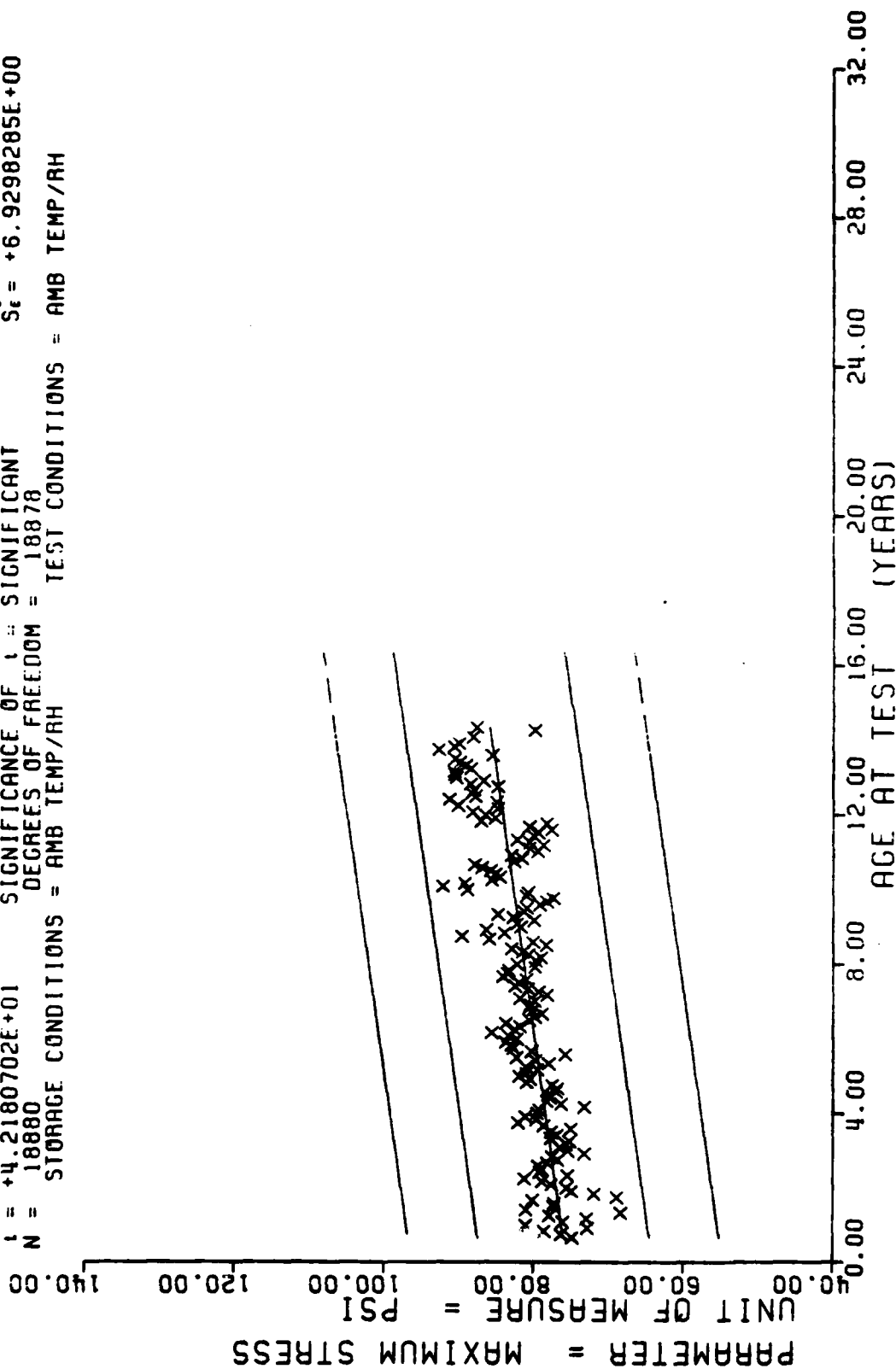
$Y = ((+2.0613719E-01) + (-1.0456836E-05) \times X)$
 $F = +9.4222983E+00$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = -2.2335906E-02$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +3.0695762E+00$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 18879$ DEGREES OF FREEDOM = 18877
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



HING 6,V.L.R. TENSILE, STRAIN AT MAX STRESS, CHS=0.002 IN/MIN TP-H1011

Figure 1

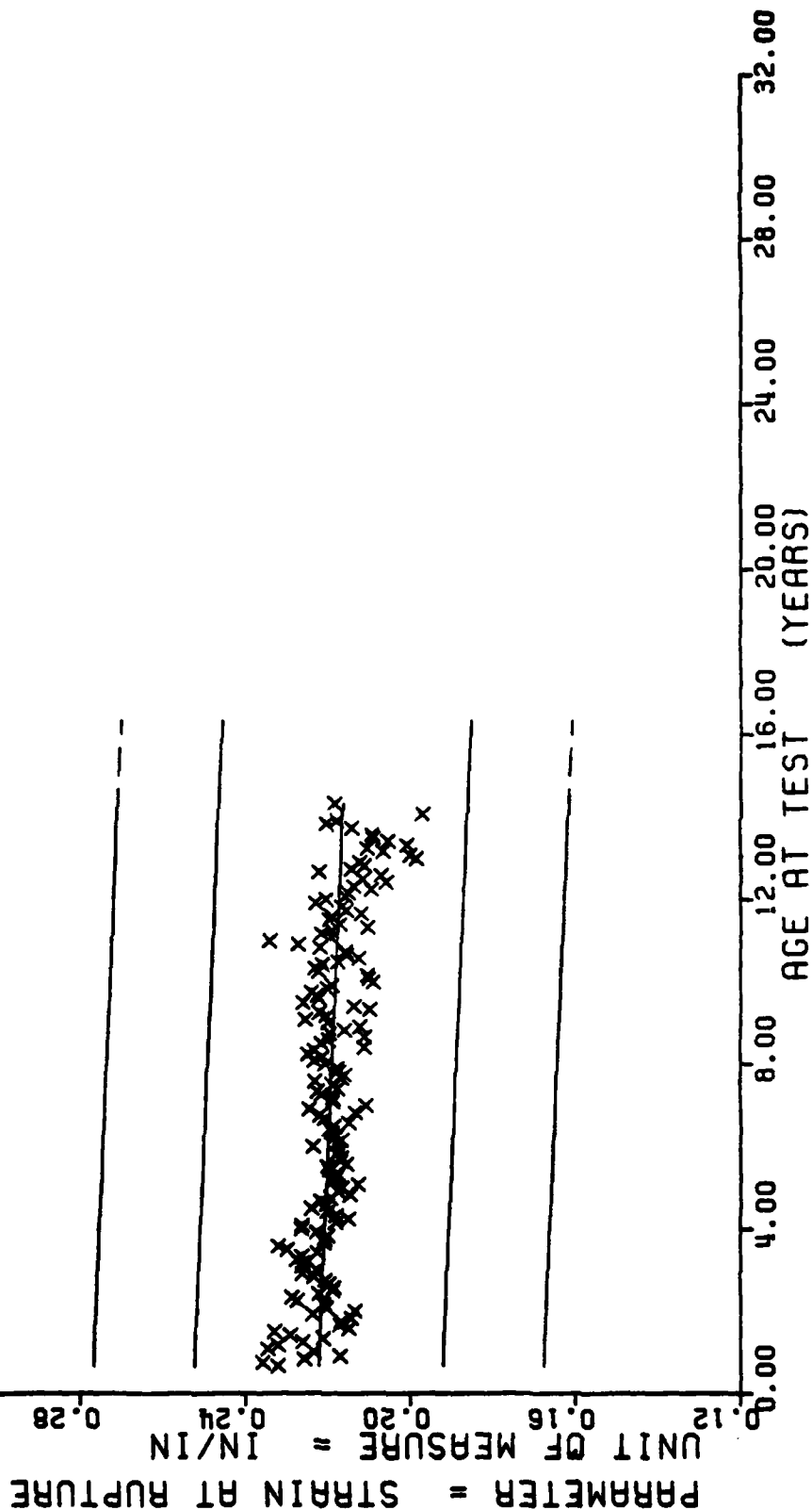
$Y = ((+7.5518493E+01) + (+6.0153802E-02) * X)$
 F = +1.7792116E+03 SIGNIFICANCE OF F = SIGNIFICANT $G_r = +7.2488455E+00$
 R = +2.9347962E-01 SIGNIFICANCE OF R = SIGNIFICANT $S_o = +1.4260976E-03$
 t = +4.2180702E+01 SIGNIFICANCE OF t = SIGNIFICANT $S_e = +6.9298285E+00$
 N = 18880 DEGREES OF FREEDOM = 18878
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6, V.L.R. TENSILE, MAX STRESS, CHS=0.002 IN/MIN TP-H1011

Figure 2

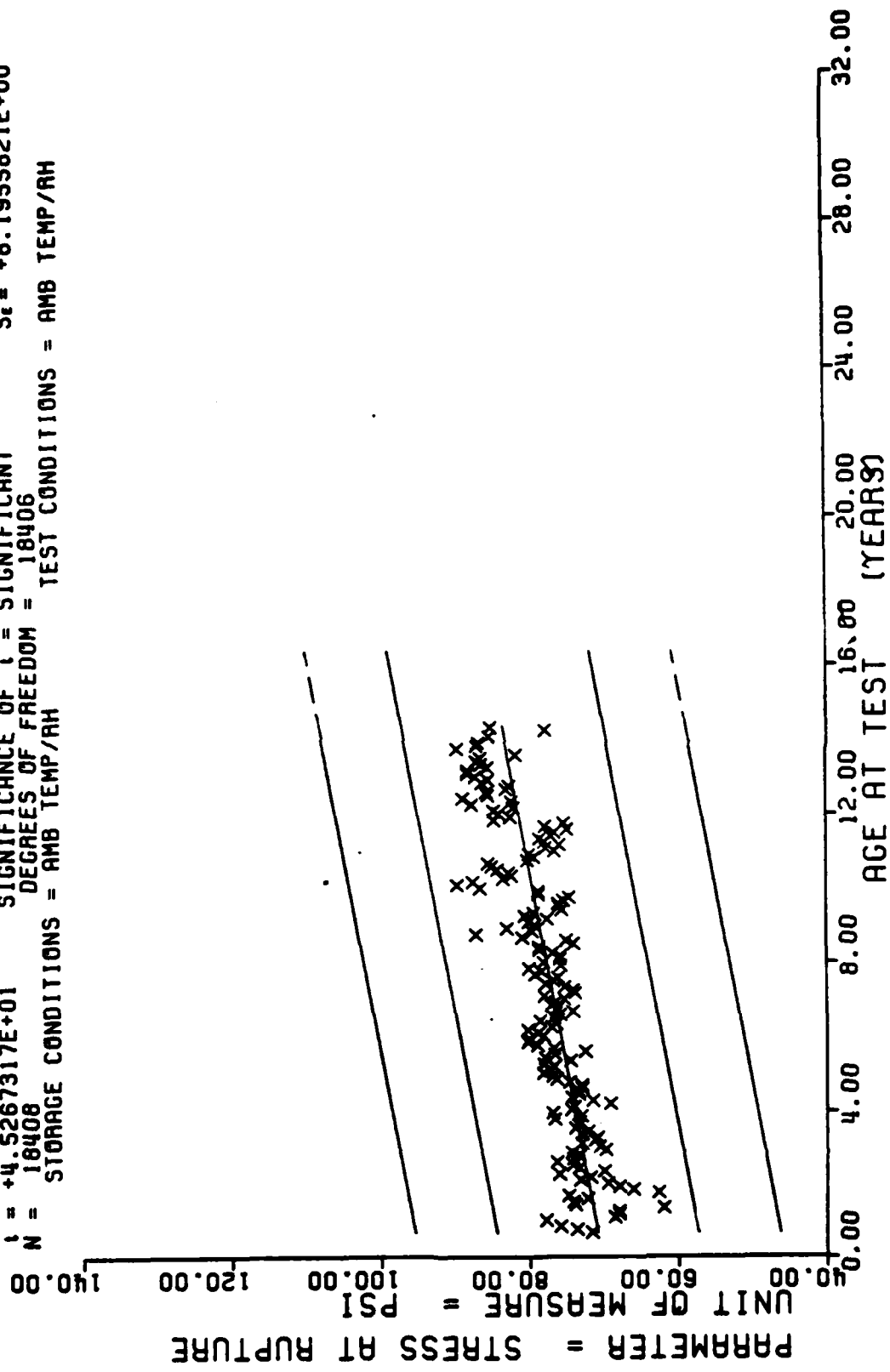
$Y = ((+2.2252966E-01) + (-3.6937665E-05) * X)$
 $F = +9.7458722E+01$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = -7.1666173E-02$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +9.8721184E+00$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 18880$ DEGREES OF FREEDOM = 18878
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6.V.L.R. TENSILE, STRAIN AT RUPTURE, CHS=0.002 IN/MIN TP-H1011

Figure 3

$Y = ((+7.0204526E+01) + (+7.6949878E-02) \times X)$
 $F = +2.0491300E+03$ SIGNIFICANCE OF F = SIGNIFICANT $G_1 = +8.6395162E+00$
 $R = +3.1650723E-01$ SIGNIFICANCE OF R = SIGNIFICANT $S_0 = +1.6998992E-03$
 $t = +4.5267317E+01$ SIGNIFICANCE OF t = SIGNIFICANT $S_e = +8.1955821E+00$
 $N = 18408$ DEGREES OF FREEDOM = 18406
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH



MING 6, V.L.R. TENSILE, STRESS AT RUPTURE, CHS=0.002 IN/MIN TP-H1011

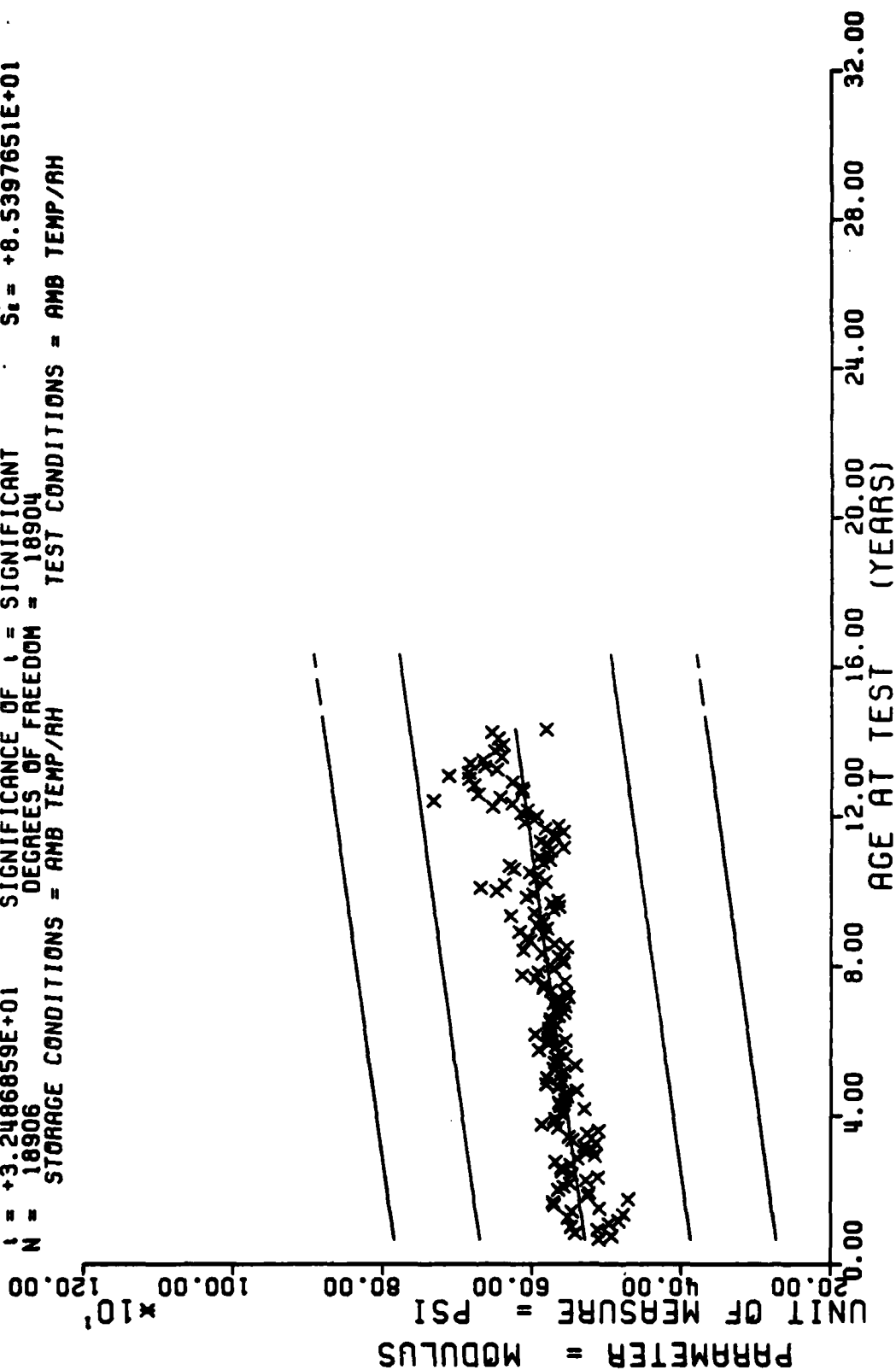
Figure 4

[illegible]

WING 6,V.L.R.TENSILE,NOVULUS,CHS=0.002 IN/MIN TP-H1011

This sample size summary is applicable to figure 5

$Y = ((+5.2456141E+02) + (+5.7141144E-01) \times X)$
 $F = +1.0553960E+03$ SIGNIFICANCE OF F = SIGNIFICANT $\sigma^2 = +8.7746799E+01$
 $R = +2.2995032E-01$ SIGNIFICANCE OF R = SIGNIFICANT $S_e = +1.7589002E-02$
 $t = +3.2486859E+01$ SIGNIFICANCE OF t = SIGNIFICANT $S_t = +8.5397651E+01$
 $N = 18906$ DEGREES OF FREEDOM = 18904
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH



WING 6.V.L.R. TENSILE MODULUS, CHS=0.002 IN/MIN TP-H1011

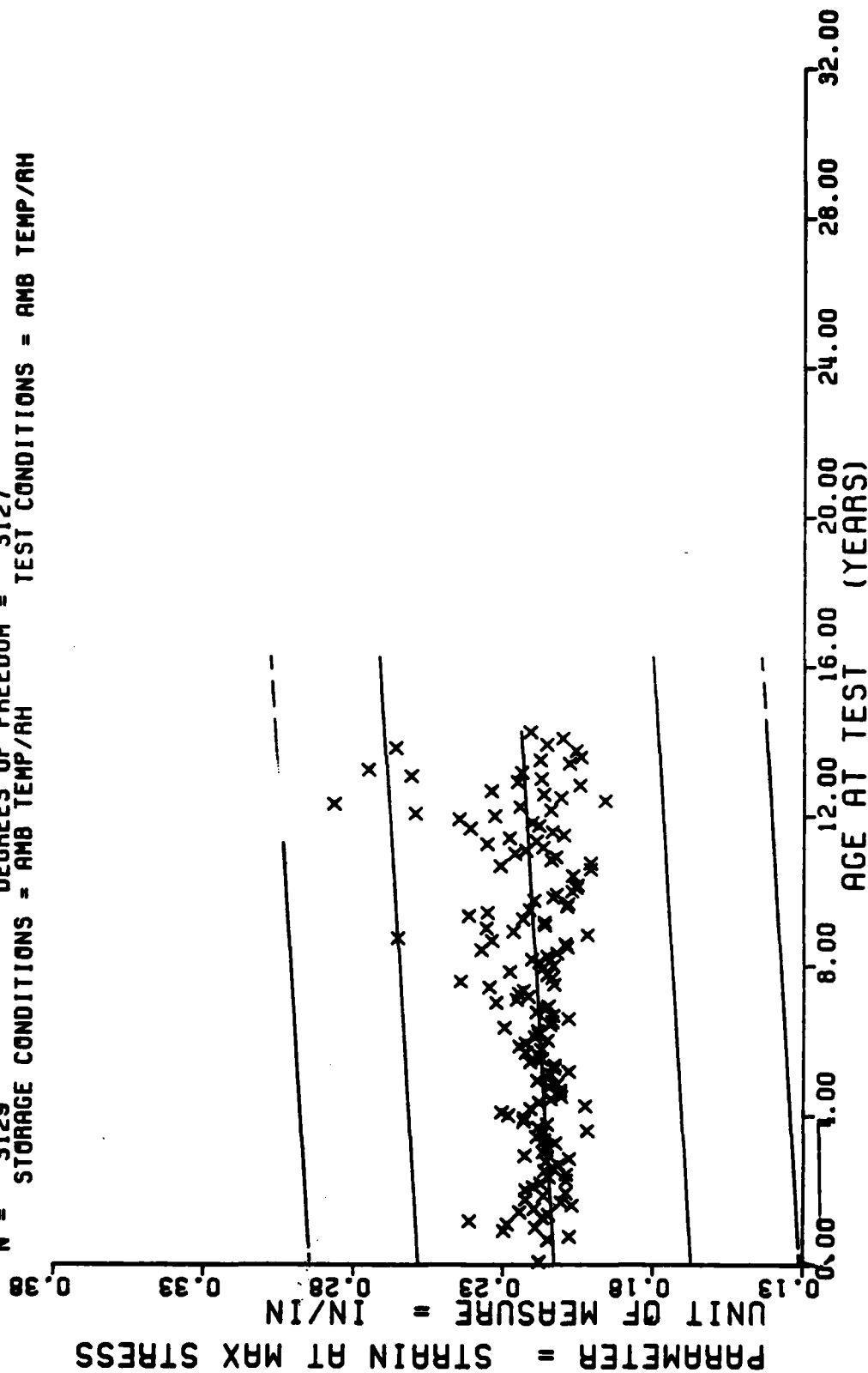
Figure 5

- 18 -

FIG. 6. L. P. BIAXIAL TENSILE STRAIN AT MAX STRESS, CHS=0.2 IN/MIN TGH-1011

This sample size summary is applicable to figures 6 thru 10

$Y = ((+2.1279627E-01) + (+6.7049873E-05) \times X)$
 $F = +2.8655620E+01$ SIGNIFICANCE OF F = SIGNIFICANT $\sigma_f = +2.7366993E-02$
 $R = +9.5292803E-02$ SIGNIFICANCE OF R = SIGNIFICANT $S_e = +1.2525441E-05$
 $t = +5.3530944E+00$ SIGNIFICANCE OF t = SIGNIFICANT $S_e = +2.7246810E-02$
 $N = 3129$ DEGREES OF FREEDOM = 3127
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH



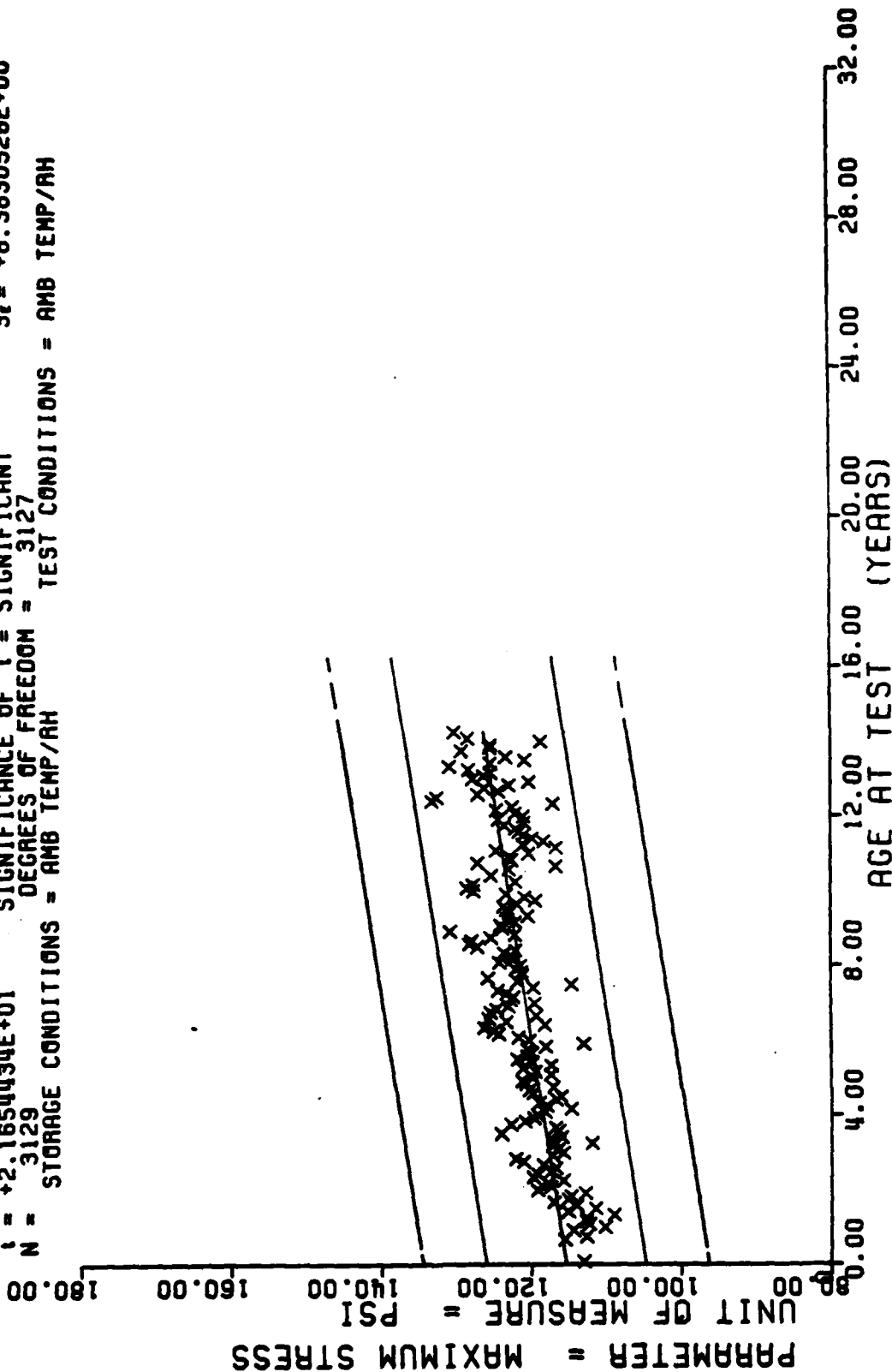
WING 6.L.A.BIAXIAL TENSILE STRAIN AT MAX STRESS, CHS=0.2 IN/MIN TPH-1011

Figure 6

$F = +4.6891455E+02$
 $R = +3.6111220E-01$
 $t = +2.1654434E+01$
 $N = 3129$

$Y = ((+1.1537593E+02) + (+6.3341709E-02) * X)$
 SIGNIFICANCE OF F = SIGNIFICANT
 SIGNIFICANCE OF R = SIGNIFICANT
 SIGNIFICANCE OF t = SIGNIFICANT
 DEGREES OF FREEDOM = 3127

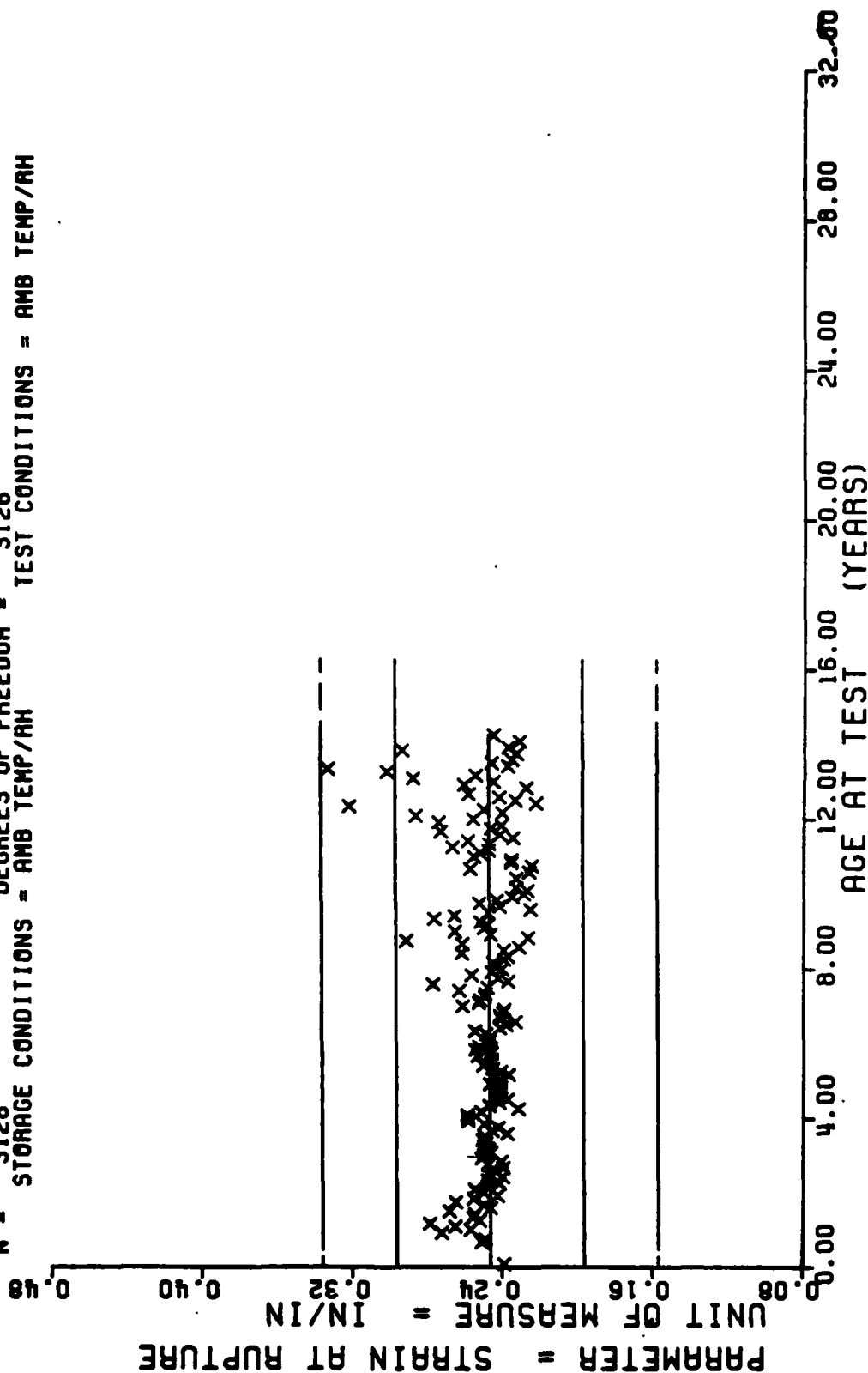
STORAGE CONDITIONS = AMB TEMP/AH
 TEST CONDITIONS = AMB TEMP/AH



WING 6.L.R. BIAxIAL TENSILE, MAXIMUM STRESS, CHS=0.2 IN/MIN TPH-1011

Figure 7

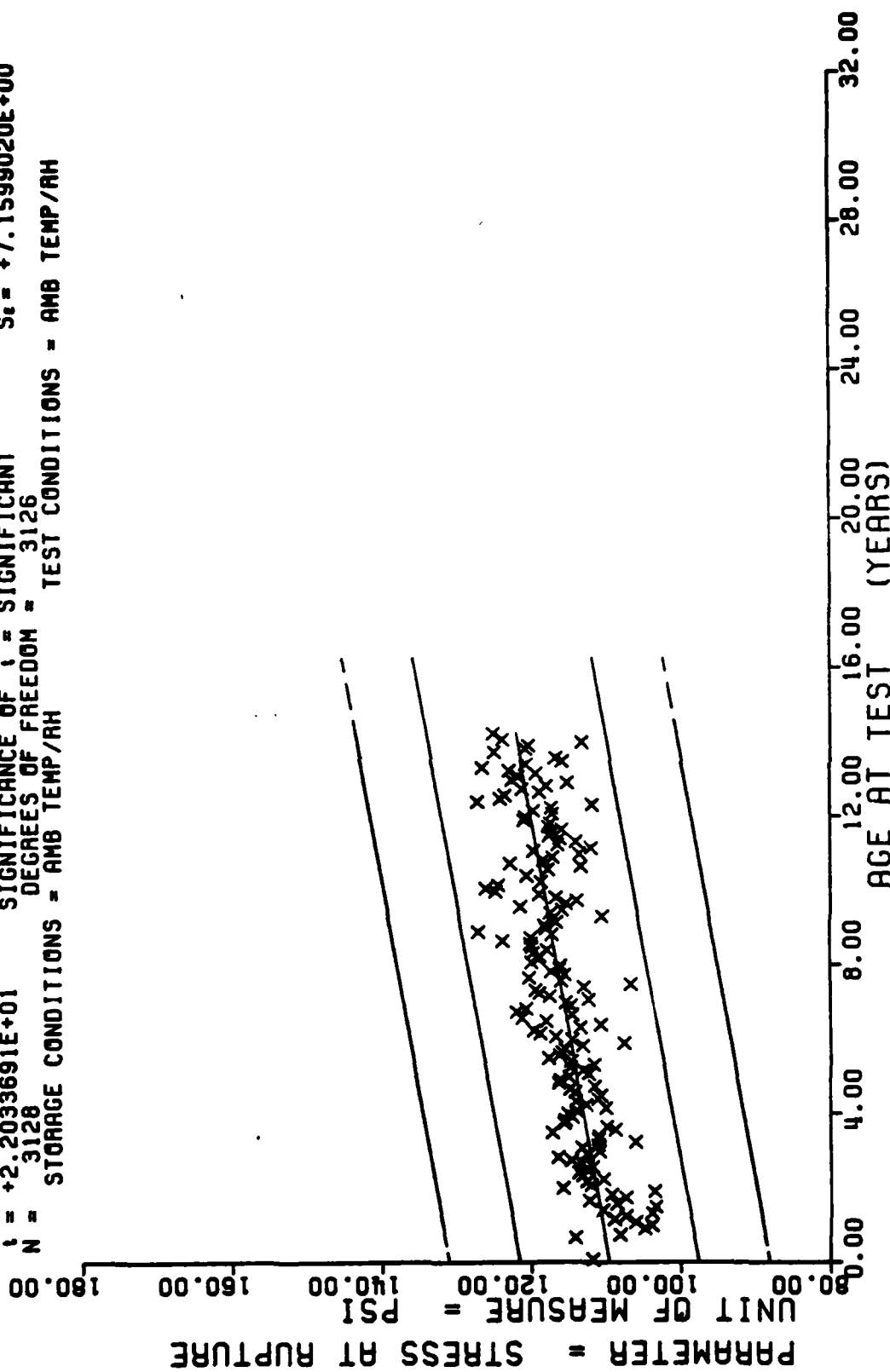
$Y = ((+2.4625715E-01) + (+1.2601488E-05) \times X)$
 $F = +8.4209113E-01$ SIGNIFICANCE OF F = NOT SIGNIFICANT $\sigma_r = +2.9866893E-02$
 $R = +1.6410679E-02$ SIGNIFICANCE OF R = NOT SIGNIFICANT $S_o = +1.3732268E-05$
 $t = +9.1765523E-01$ SIGNIFICANCE OF t = NOT SIGNIFICANT $S_t = +2.9867648E-02$
 $N = 3128$ DEGREES OF FREEDOM = 3126
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH



WING 6.L.A. BIAXIAL TENSILE, STRAIN AT RUPTURE, CHS=0.2 IN/MIN TPH-1011

Figure 8

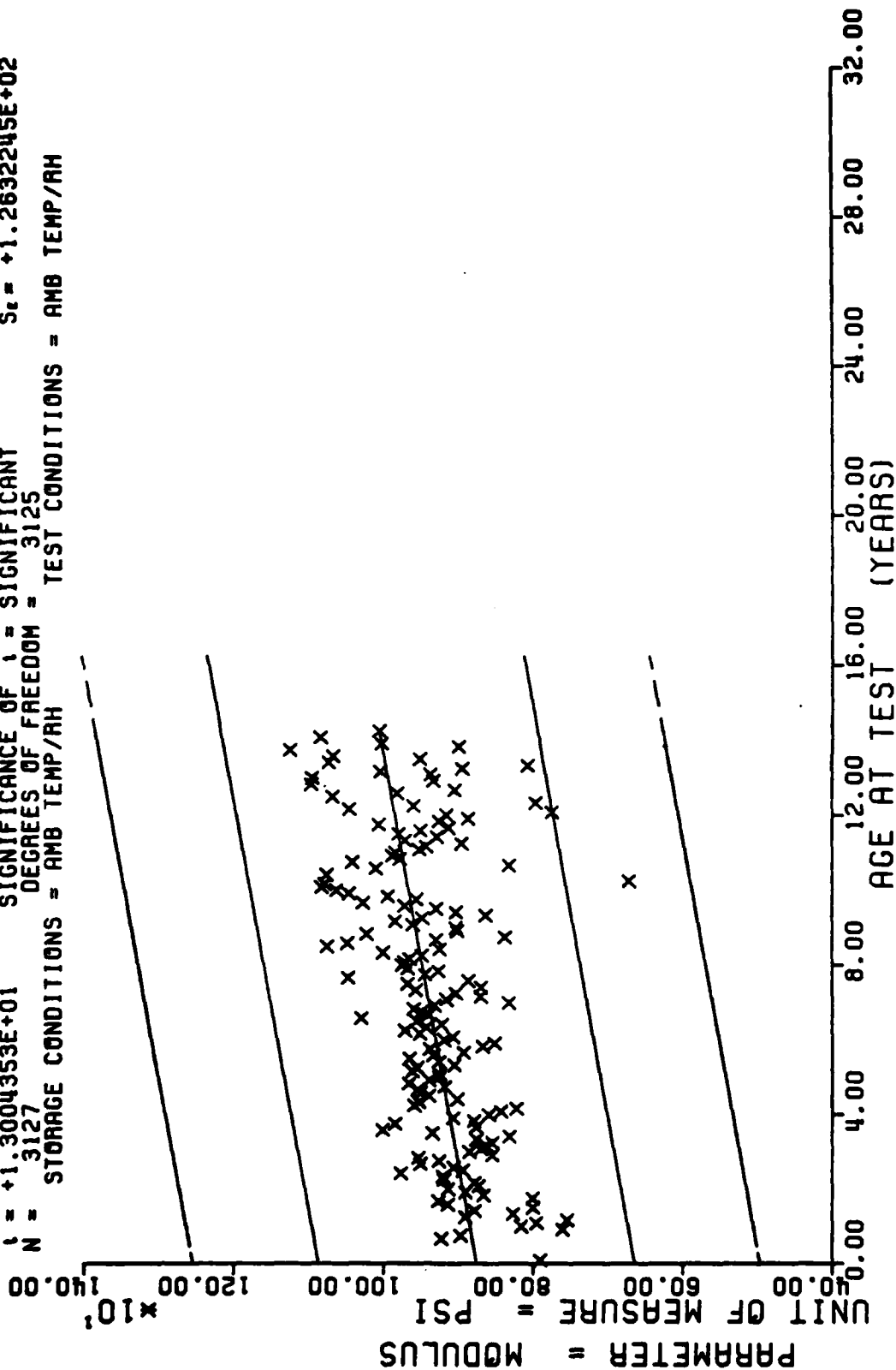
$F = +4.8548355E+02$ SIGNIFICANCE OF $F = (+7.2532994E-02)$ $\times X$
 $R = +3.6664388E-01$ SIGNIFICANCE OF $R =$ SIGNIFICANT
 $t = +2.2033691E+01$ SIGNIFICANCE OF $t =$ SIGNIFICANT
 $N = 3126$ DEGREES OF FREEDOM = 3126
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6.L.R.BIAXIAL TENSILE,STRESS AT RUPTURE,CHS=0.2 IN/MIN TPH-1011

Figure 9

$Y = (1 + 8.7525072E+02) + (+ 7.5578274E-01) \times X$
 $F = +1.6911320E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +2.2657892E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +1.3004353E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 3127$ DEGREES OF FREEDOM = 3125
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6, L. R. BIAxIAL TENSILE, MODULUS, CHS=0.2 IN/MIN TPH-1011

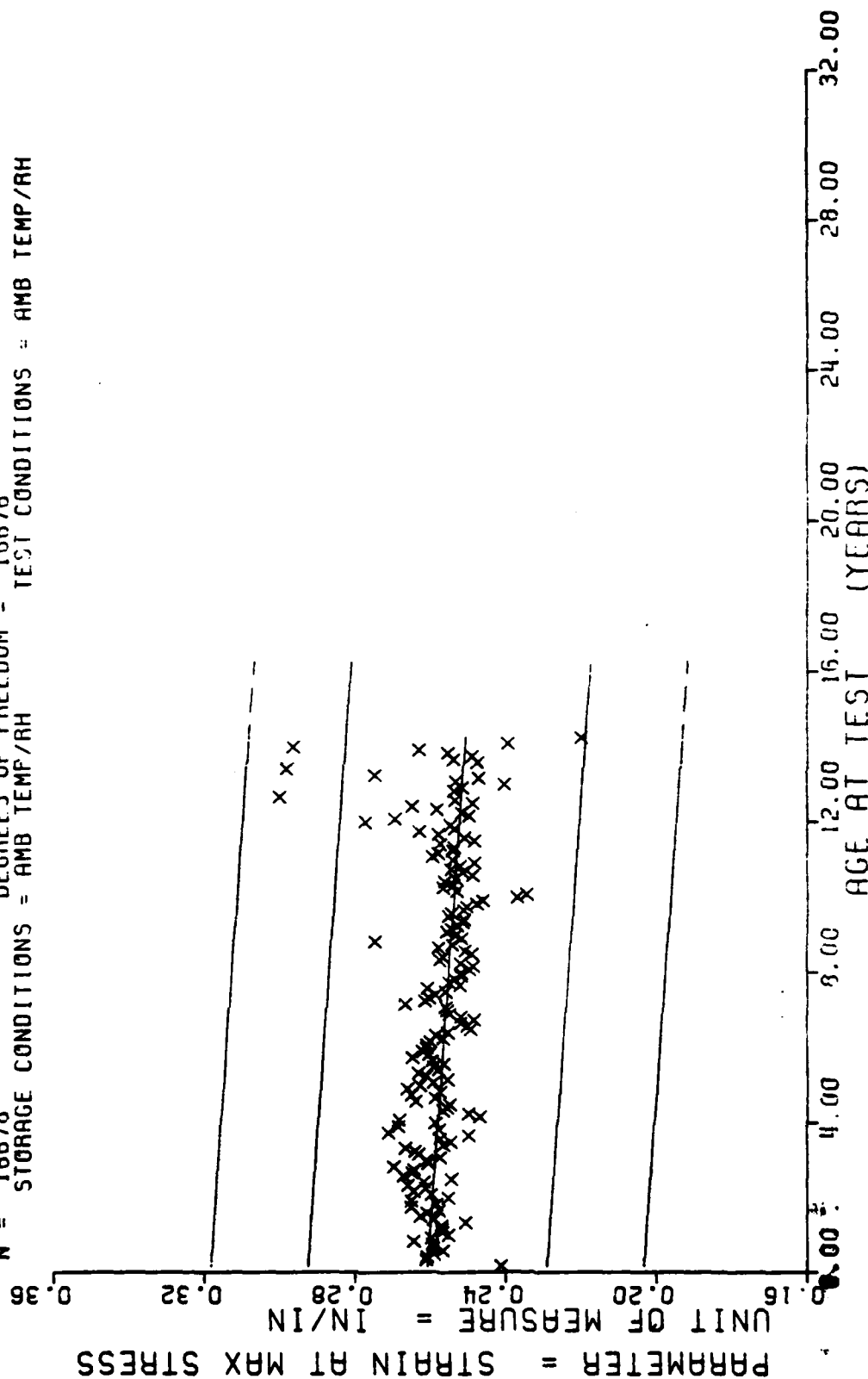
Figure 10

AGE (MOS)	NP SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NP SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NP SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NP SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NP SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NP SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NP SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NP SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NP SAMP
2	3	28	82	53	97	78	177	103	53	128	74	153	6																				
4	57	29	55	54	83	79	129	104	81	129	51	154	18																				
5	151	30	52	55	143	80	132	105	18	130	261	155	24																				
6	191	31	52	56	108	81	179	106	15	131	141	156	18																				
7	171	32	124	57	172	82	94	107	27	132	55	157	15																				
8	143	33	85	58	158	83	100	108	111	133	63	158	15																				
9	194	34	78	59	134	84	75	109	109	134	102	159	12																				
10	189	35	44	60	159	85	83	110	62	135	47	160	12																				
11	192	36	154	61	184	86	60	111	33	136	45	161	18																				
12	220	37	83	62	218	87	153	112	96	137	93	165	3																				
13	213	38	39	63	243	88	143	113	120	138	267	168	12																				
14	223	39	93	64	134	89	150	114	73	139	153	169	3																				
15	222	40	65	65	75	90	117	115	77	140	40	171	9																				
16	212	41	35	66	61	91	94	116	270	141	38																						
17	184	42	69	67	104	92	80	117	261	142	84																						
18	.26	43	75	68	110	93	81	118	161	143	220																						
19	67	44	21	69	154	94	131	119	117	144	27																						
20	18	45	20	70	188	95	136	120	253	145	18																						
21	78	46	58	71	172	96	228	121	115	146	39																						
22	43	47	106	72	145	97	242	122	38	147	12																						
23	30	48	85	73	153	98	226	123	40	148	18																						
24	77	49	122	74	172	99	147	124	42	149	23																						
25	51	50	108	75	241	100	65	125	60	150	38																						
26	56	51	175	76	158	101	103	126	78	151	17																						
27	59	52	223	77	154	102	22	127	59	152	9																						

WING 6.L.P.T'NSILF,STRAIN AT MAX STRESS,CHS=2.0 IN/MIN TP-H1011

This sample size summary is applicable to figures 11 thru 15

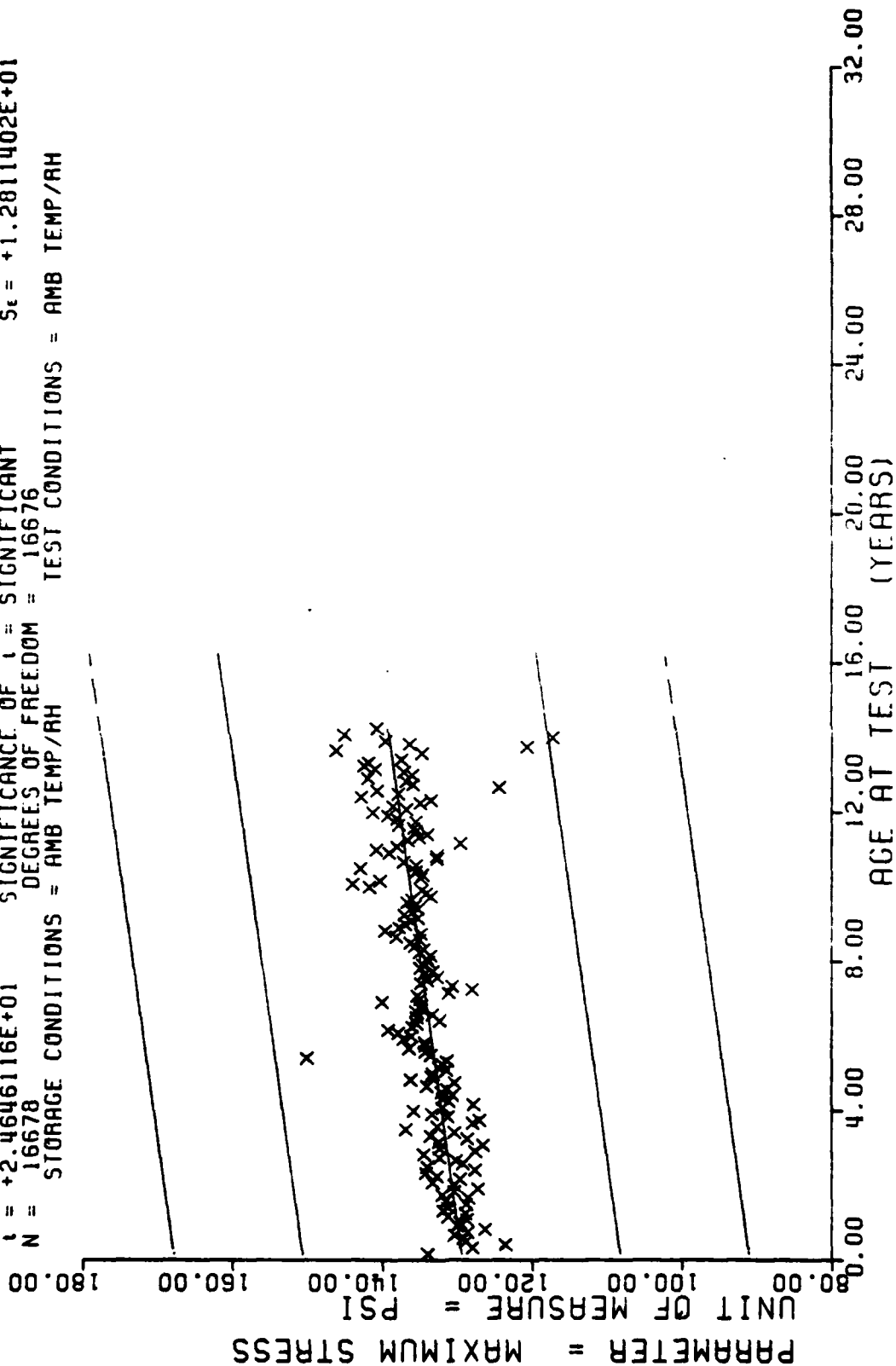
$Y = ((+2.6086913E-01) + (-6.0010934E-05) \times X)$
 $F = +2.8832867E+02$ SIGNIFICANCE OF F = SIGNIFICANT $G_r = +1.9316542E-02$
 $R = -1.3036937E-01$ SIGNIFICANCE OF R = SIGNIFICANT $S_p = +3.5341621E-06$
 $t = +1.6980243E+01$ SIGNIFICANCE OF t = SIGNIFICANT $S_t = +1.9152259E-02$
 $N = 16678$ DEGREES OF FREEDOM = 16676
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING G.L.R. TENSILE, STRAIN AT MAX STRESS, CHS-2.0 IN/MIN IP-H1011

Figure 11

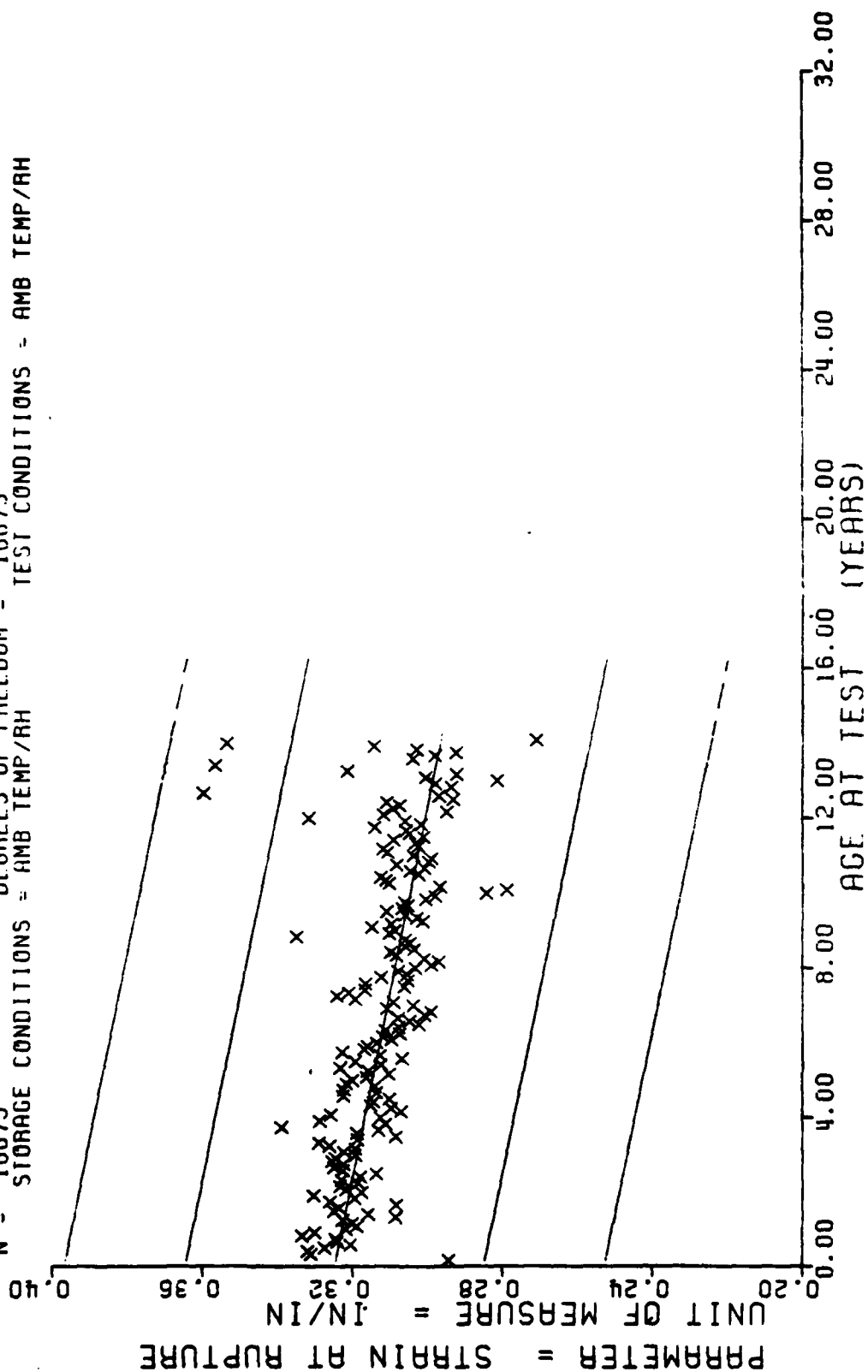
$Y = ((+1.2932618E+02) + (+5.8265519E-02) \times X)$
 $F = +6.0743105E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +1.8747074E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +2.4646116E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 16678$ DEGREES OF FREEDOM = 16676
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH



WING G.L.R. TENSILE, MAXIMUM STRESS, CHS=2.0 IN/MIN IP-H1011

Figure 12

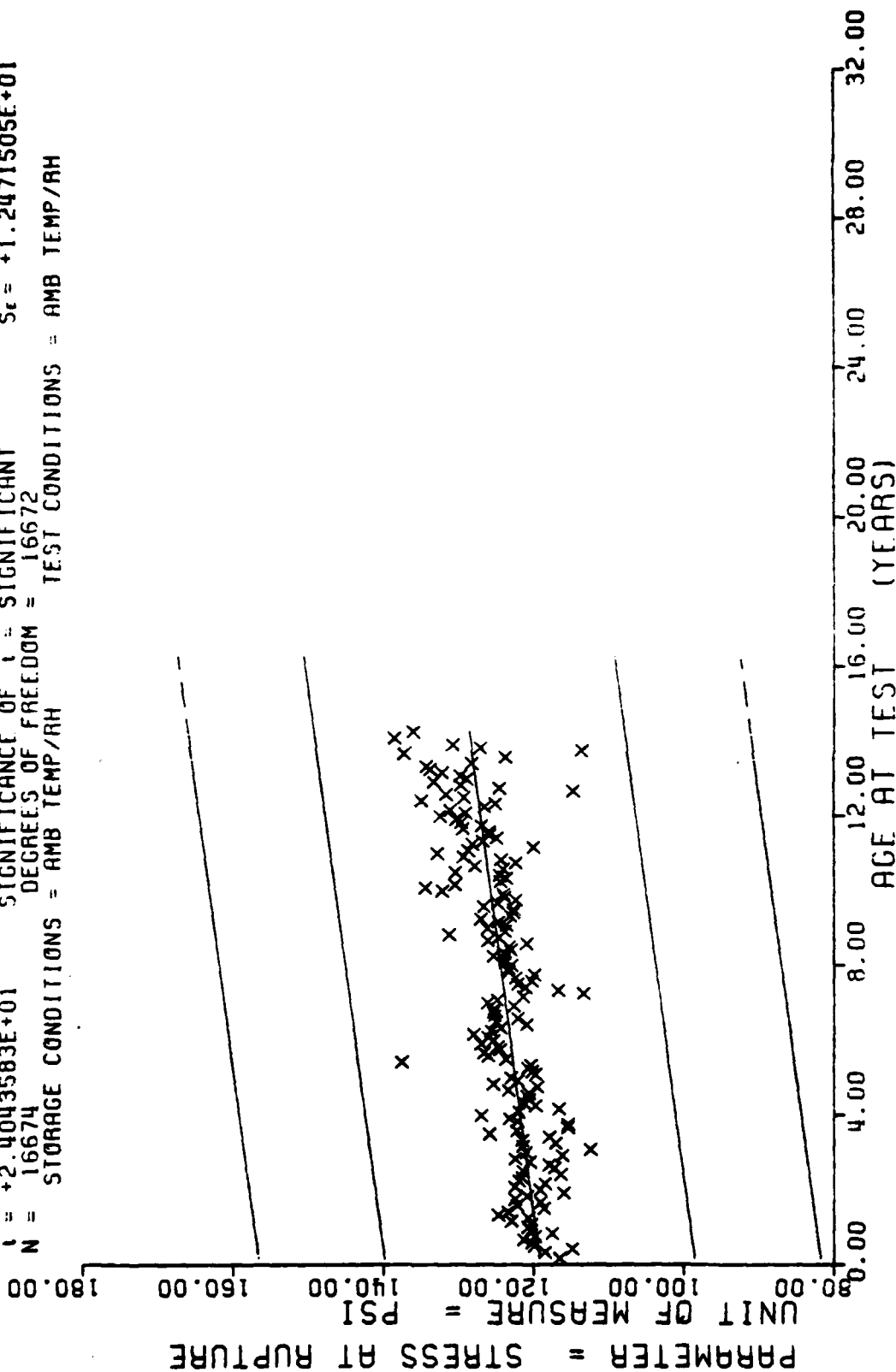
$Y = ((+3.2479841E-01) + (-1.6888916E-04) \times X)$
 $F = +1.4529867E+03$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = -2.8312615E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +3.8118063E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 16675$ DEGREES OF FREEDOM = 16673
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING G.L.R. TENSILE, STRAIN AT RUPTURE, CHS-2.0 IN/MIN TP-H1011

Figure 13

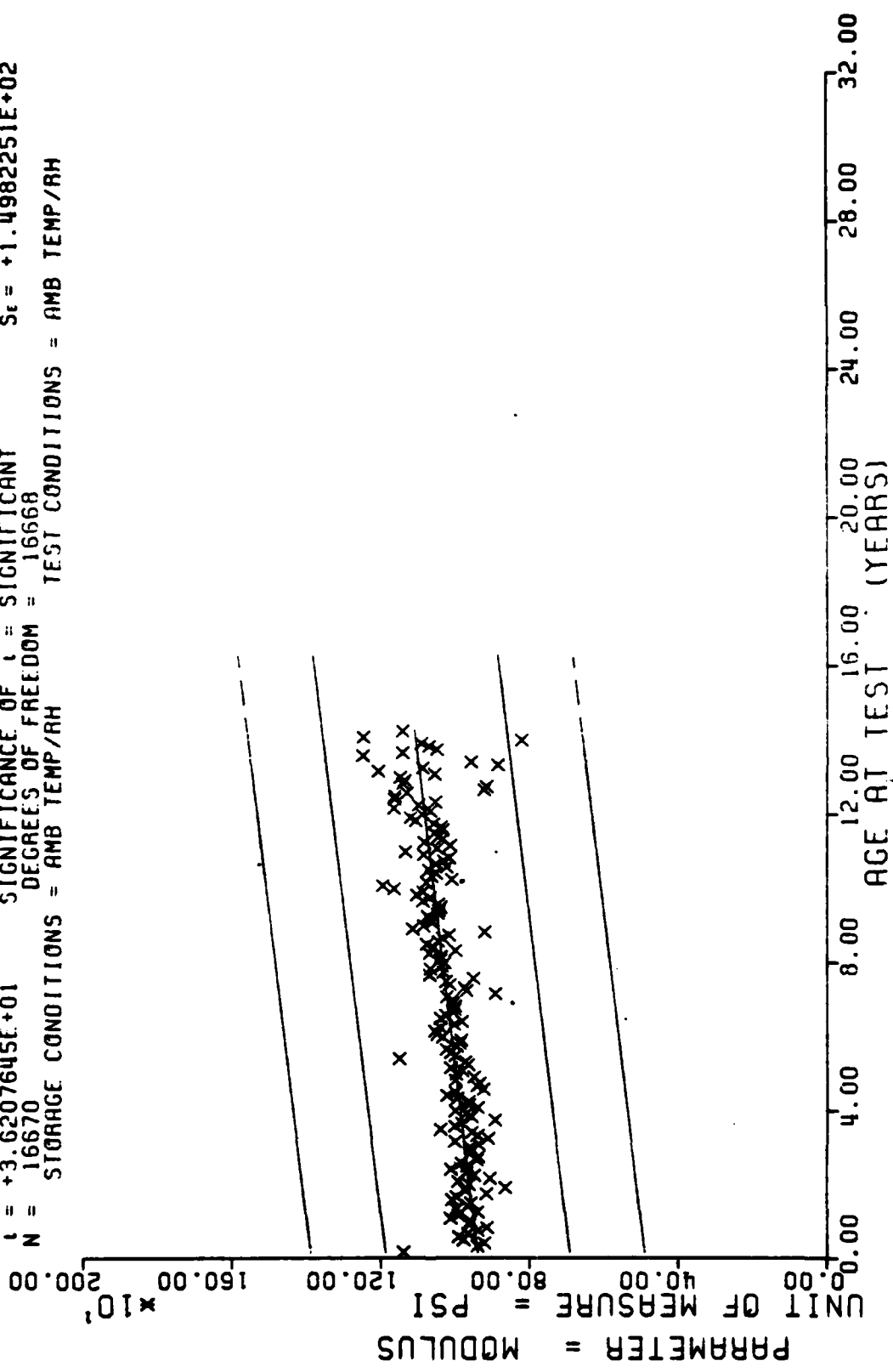
$Y = ((+1.1906640E+02) + (+5.5341816E-02) \times X)$
 $F = +5.7809391E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +1.8306421E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +2.4043583E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 16674$ DEGREES OF FREEDOM = 16672
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING G.L.R. TENSILE, STRESS AT RUPTURE, CHS-2.0 IN/MIN TP-H1011

Figure 14

$F = +1.3109936E+03$ SIGNIFICANCE OF F = $(+1.0010178E+00) \times X)$
 $R = +2.7003347E-01$ SIGNIFICANT
 $t = +3.6207645E+01$ SIGNIFICANT
 $N = 16670$ DEGREES OF FREEDOM = 16668
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6. L.L.R. TENSILE, MODULUS, CHS=2.0 IN/MIN TP-H1011

Figure 15

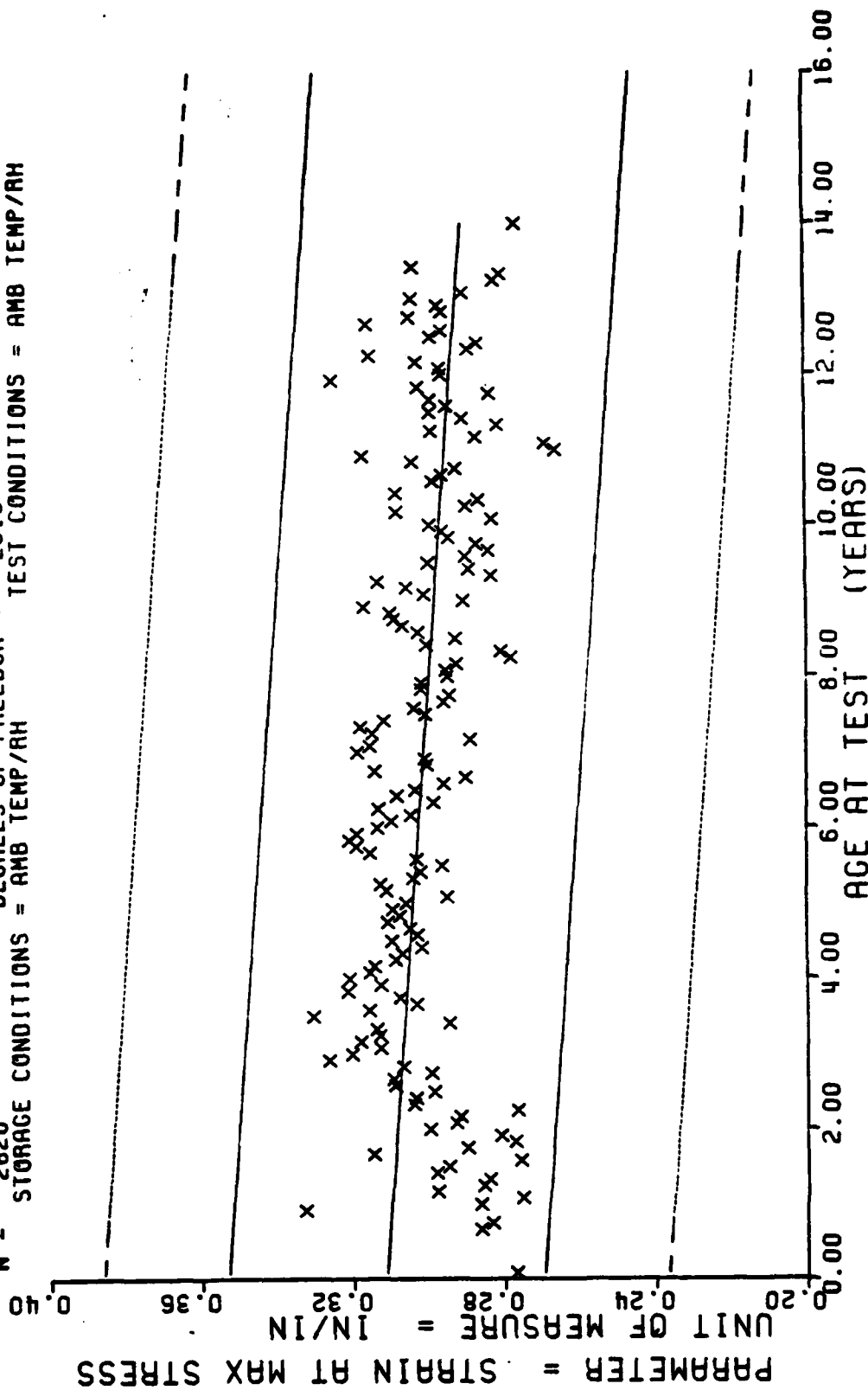
*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
1	2	33	23	58	30	83	9	108	8	134	14	134	14
8	2	34	22	59	27	84	8	109	19	135	14	135	14
9	4	35	24	60	22	85	14	110	32	136	4	136	4
11	4	36	26	61	36	86	8	111	8	137	10	137	10
12	14	37	16	62	38	87	10	112	8	138	25	138	25
13	17	38	11	63	41	88	16	113	18	139	14	139	14
14	6	39	25	64	42	89	19	114	49	140	4	140	4
15	6	40	10	65	28	90	19	115	53	141	9	141	9
16	8	41	8	66	27	91	27	116	57	142	8	142	8
17	4	42	6	67	28	92	6	117	42	143	4	143	4
18	14	43	2	68	29	93	12	118	21	144	41	144	41
19	11	44	4	69	24	94	16	119	21	145	25	145	25
20	20	45	2	70	59	95	16	120	39	146	6	146	6
21	4	46	6	71	38	96	13	121	8	147	4	147	4
22	10	47	18	72	21	97	23	122	12	148	2	148	2
23	6	48	9	73	32	98	22	123	11	149	6	149	6
24	8	49	34	74	27	99	26	124	2	150	8	150	8
25	23	50	34	75	22	100	18	125	6	151	6	151	6
26	13	51	24	76	20	101	15	127	6	152	4	152	4
27	11	52	42	77	13	102	8	128	6	153	2	153	2
28	17	53	42	78	14	103	6	129	4	154	2	154	2
29	14	54	14	79	27	104	11	130	19	155	2	155	2
30	18	55	37	80	14	105	8	131	16	156	2	156	2
31	16	56	22	81	15	106	6	132	45	157	10	157	10
32	23	57	30	82	22	107	2	133	30	159	4	159	4
										160	2	160	2
										161	4	161	4
										168	2	168	2

WING 6.H.P. TRIAXIAL TENSILE STRAIN AT MAX STRESS, CHS=1750 IN/MIN, 800 PSI

This sample size summary is applicable to figures 16 thru 20

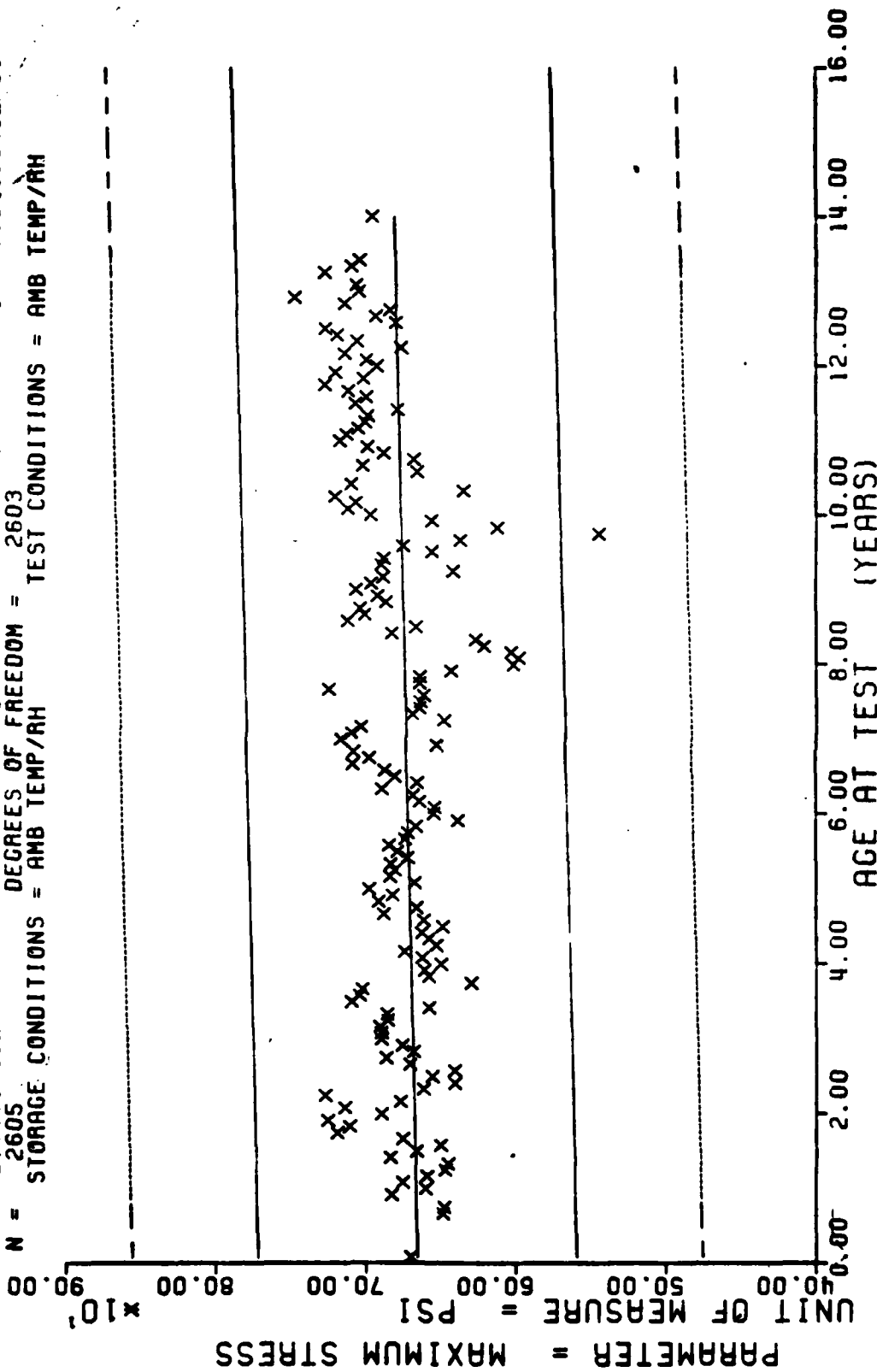
$Y = ((+3.1149259E-01) + (-1.2423929E-04) * X)$
 $F = +8.9411780E+01$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = -1.8172731E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +9.4557802E+00$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 2620$ DEGREES OF FREEDOM = 2618
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6.H.R. TRIAXIAL TENSILE STRAIN AT MAX STRESS, CHS=1750 IN/MIN, 800 PSI

Figure 16

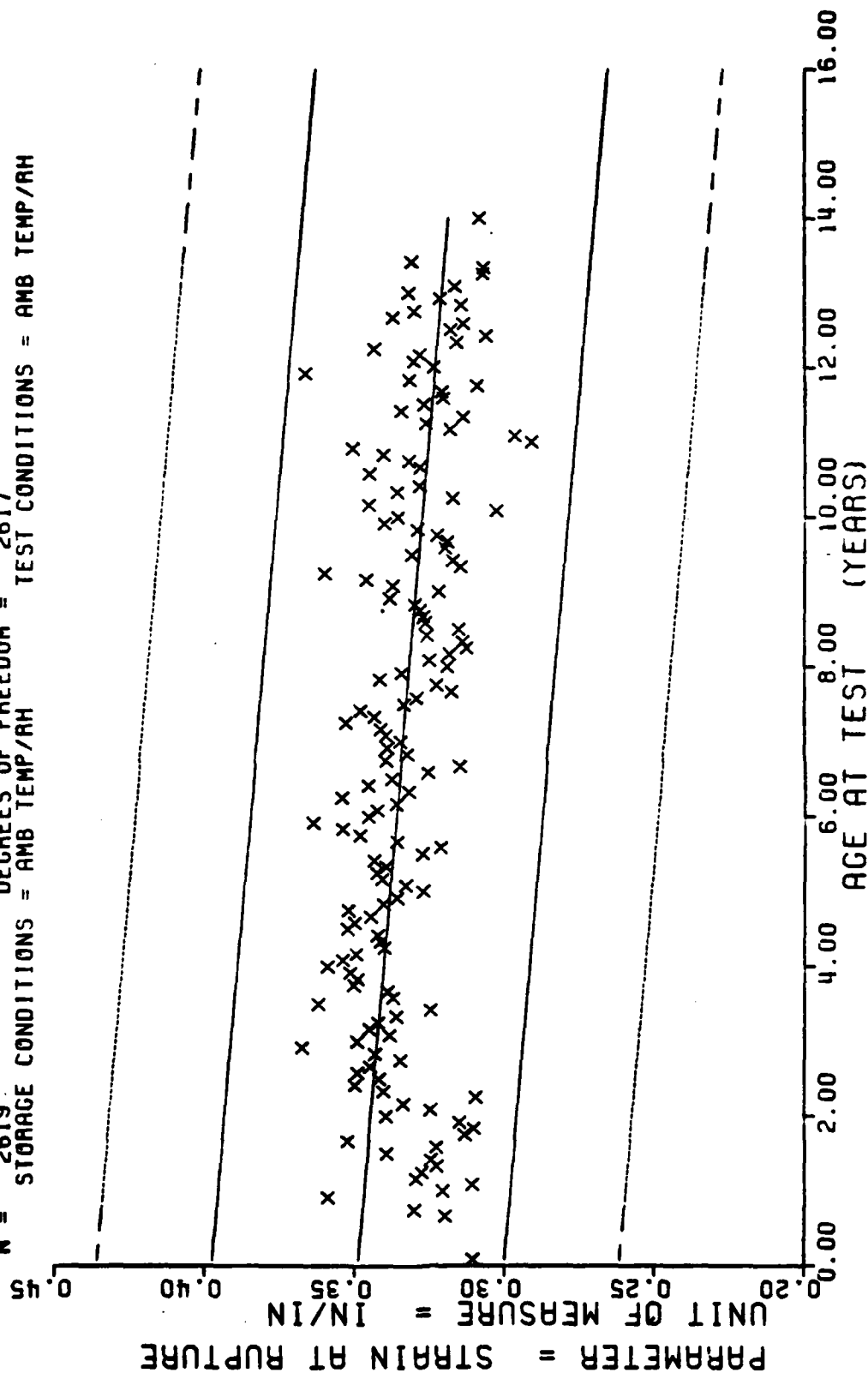
$Y = (1 + 6.6559054E+02) + (+9.2196861E-02) * X$
 $F = +7.5798877E+00$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +5.3884380E-02$ SIGNIFICANCE OF R = SIGNIFICANT
 $I = +2.7531596E+00$ SIGNIFICANCE OF I = SIGNIFICANT
 $N = 2605$ DEGREES OF FREEDOM = 2603
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6.H.R. TRIAXIAL TENSILE, MAXIMUM STRESS, CHS=1750 IN/MIN, 800 PSI

Figure 17

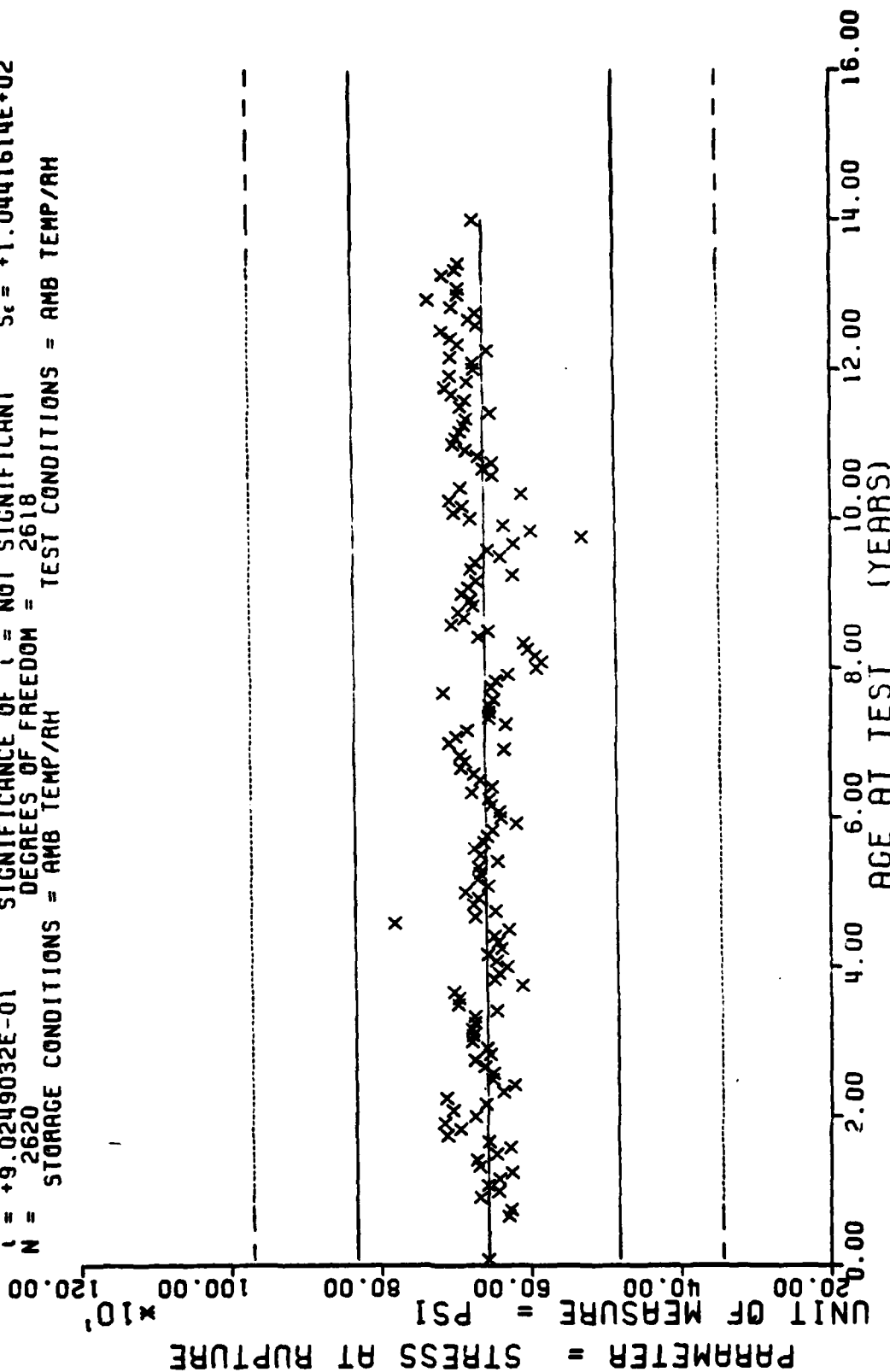
$Y = ((+3.488681E-01) + (-1.7922443E-04) \times X)$
 $F = +1.3691368E+02$ SIGNIFICANCE OF F = SIGNIFICANT $\sigma_r = +2.9768870E-02$
 $R = -2.2297094E-01$ SIGNIFICANCE OF R = SIGNIFICANT $S_e = +1.5317002E-05$
 $t = +1.1701012E+01$ SIGNIFICANCE OF t = SIGNIFICANT $S_t = +2.9024986E-02$
 $N = 2619$ DEGREES OF FREEDOM = 2617
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6.H.R. TRIAXIAL TENSILE STRAIN AT RUPTURE, CHS=1750 IN/MIN, 800 PSI

Figure 18

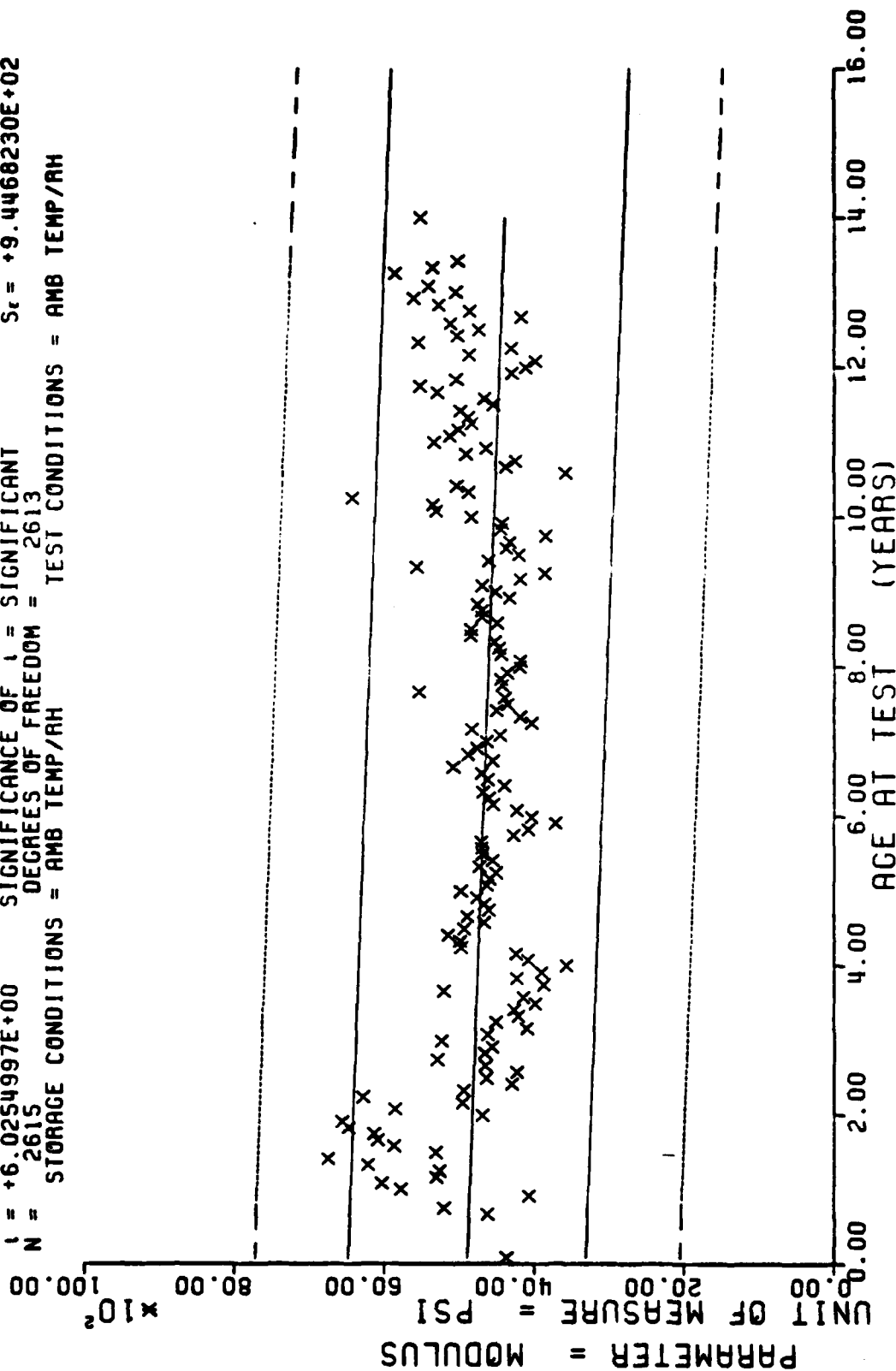
$Y = ((+6.5652201E+02) + (+4.9727324E-02) \times X)$
 $F = +8.1448878E-01$ SIGNIFICANCE OF F = NOT SIGNIFICANT $\sigma_r = +1.0441244E+02$
 $R = +1.7635597E-02$ SIGNIFICANCE OF R = NOT SIGNIFICANT $S_e = +5.5100119E-02$
 $t = +9.0249032E-01$ SIGNIFICANCE OF t = NOT SIGNIFICANT $S_c = +1.0441614E+02$
 $N = 2620$ DEGREES OF FREEDOM = 2618
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6.H.A. TRIAXIAL TENSILE STRESS AT RUPTURE, CHS=1750 IN/MIN, 800 PSI

Figure 19

$Y = ((+4.8986219E+03) + (-3.0075010E+00) \times X)$
 $F = +3.6306647E+01$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = -1.1706496E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $I = +6.0254997E+00$ SIGNIFICANCE OF I = SIGNIFICANT
 $N = 2615$ DEGREES OF FREEDOM = 2613
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



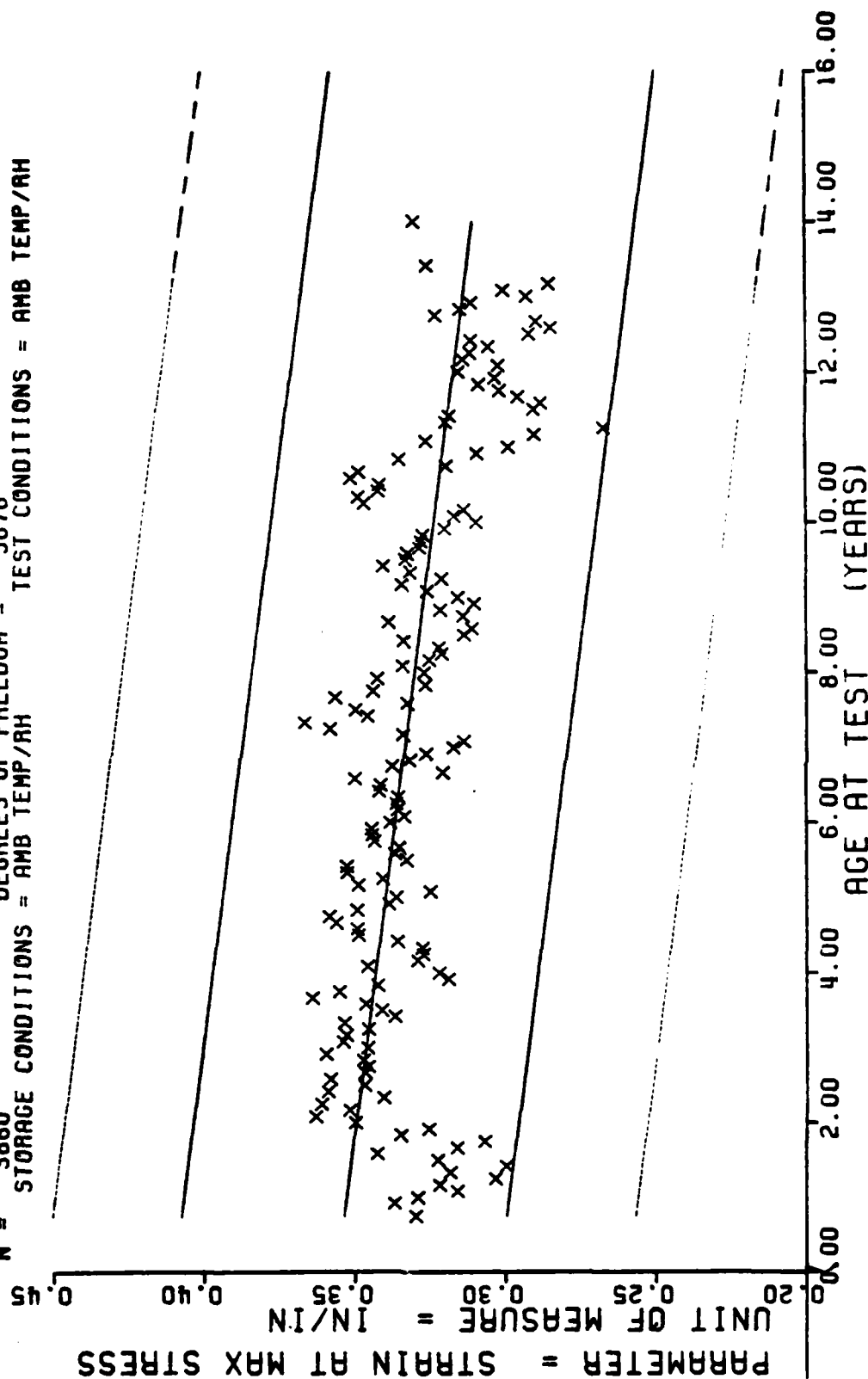
WING G.H.R. TRIAXIAL TENSILE MODULUS, CHS=1750 IN/MIN AT 800 PSI

Figure 20

[illegible]

This sample size summary is applicable to figures 21 thru 25

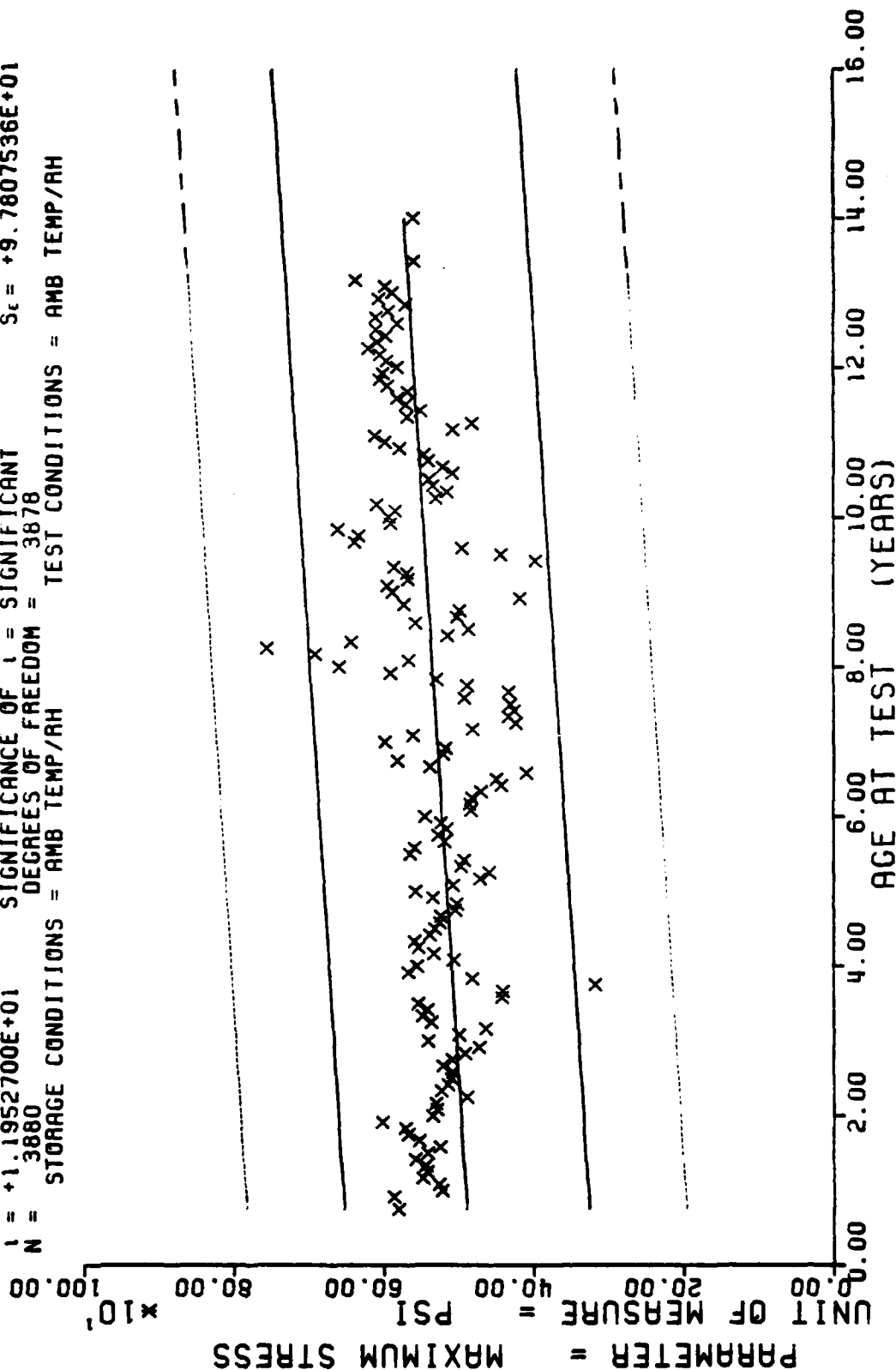
$Y = ((+3.5593082E-01) + (-2.7148971E-04) * X)$
 $F = +3.5244082E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = -2.8863586E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +1.8773407E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 3880$ DEGREES OF FREEDOM = 3878
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6,H.R.HYDROSTATIC STRAIN AT MAX STRESS.1750IN/MIN.600 PSI

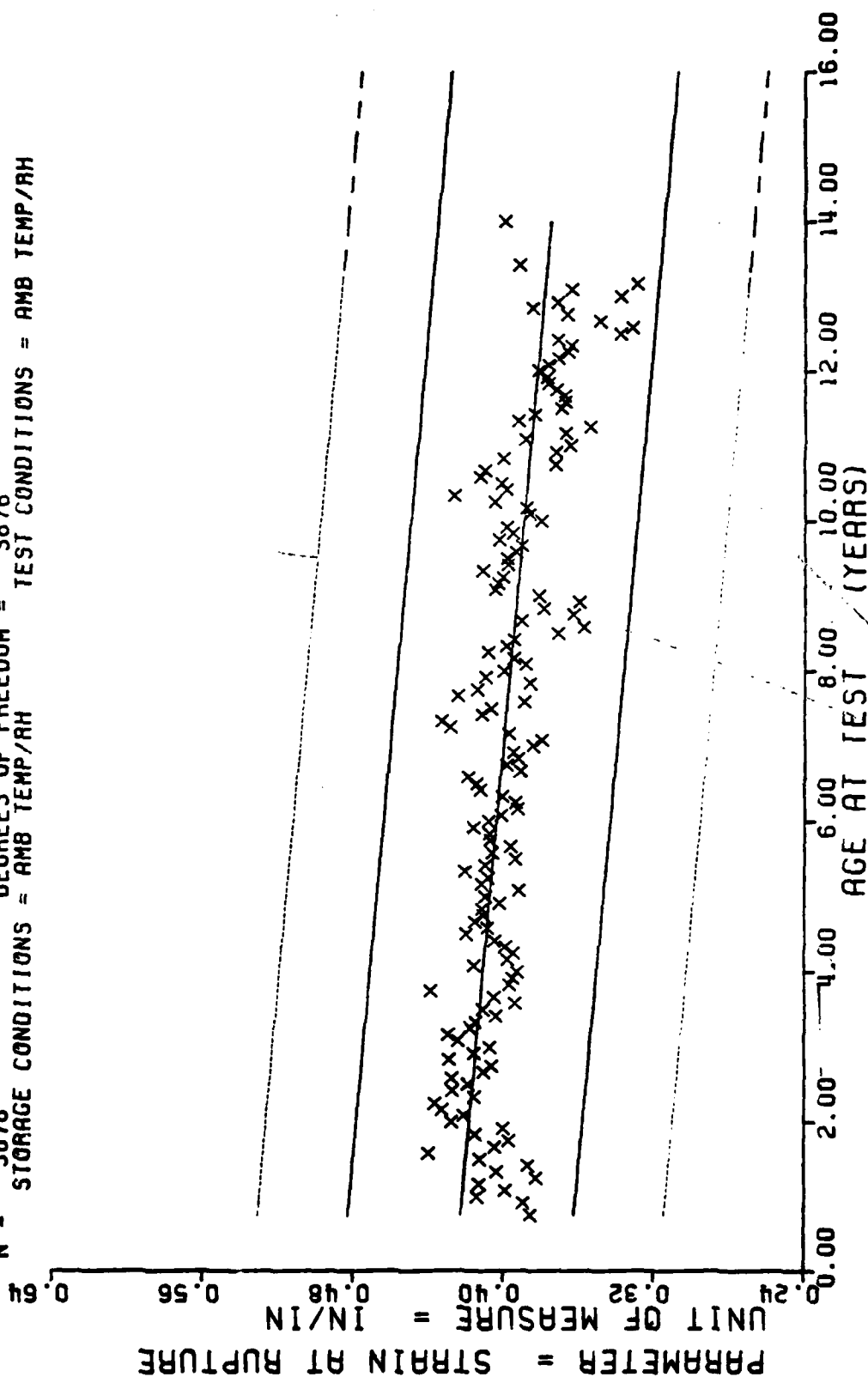
Figure 21

$Y = ((+4.8468672E+02) + (+5.2417731E-01) * X)$
 $F = +1.4286704E+02$ SIGNIFICANCE OF F = SIGNIFICANT $G_r = +9.9580037E+01$
 $R = +1.8849775E-01$ SIGNIFICANCE OF R = SIGNIFICANT $S_e = +4.3854300E-02$
 $I = +1.1952700E+01$ SIGNIFICANCE OF I = SIGNIFICANT $S_t = +9.7807536E+01$
 $N = 3880$ DEGREES OF FREEDOM = 3878
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6.H.R. HYDROSTATIC MAXIMUM STRESS, 1750 IN/MIN, 800 PSI

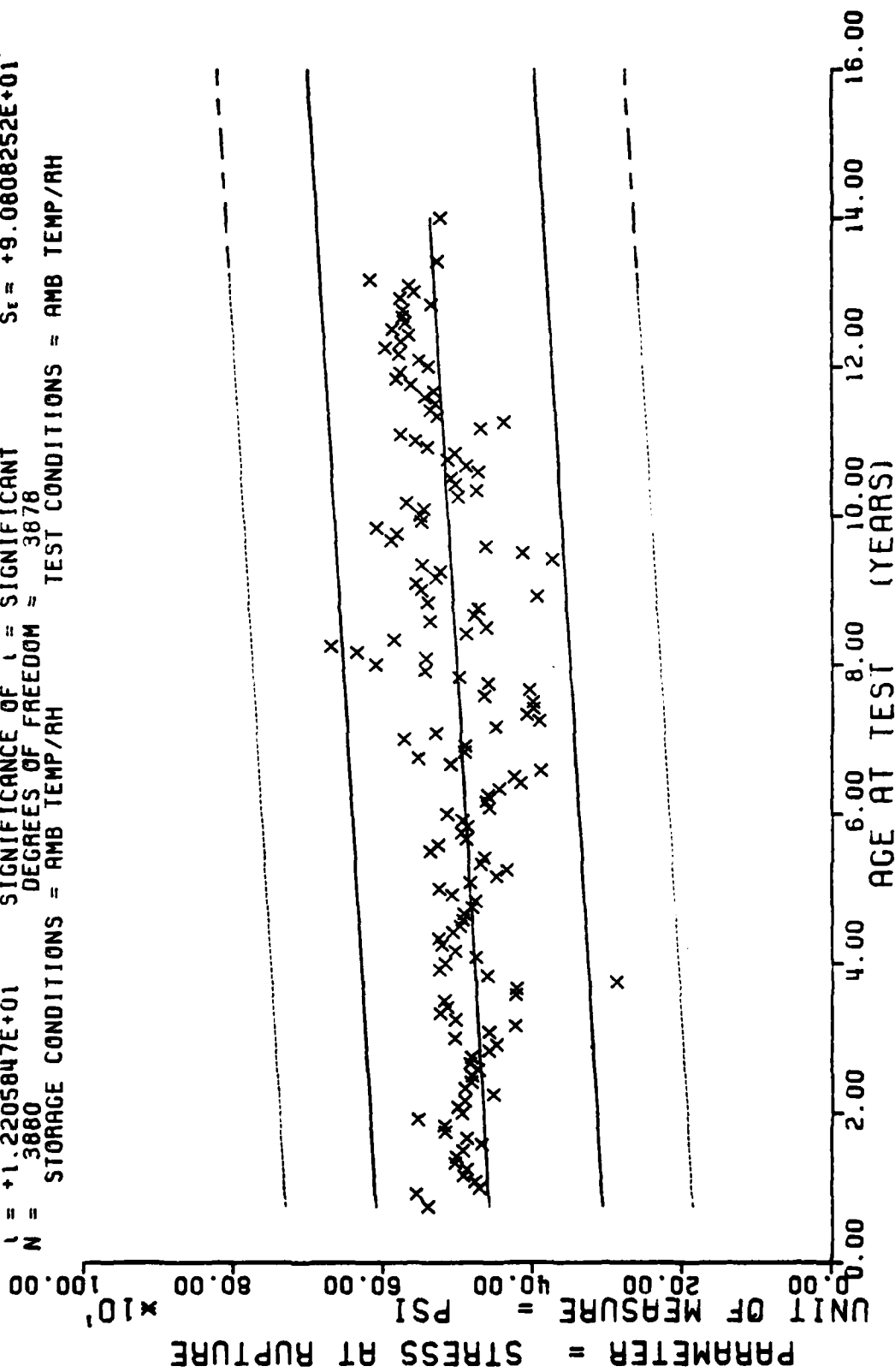
$Y = ((+4.2534421E-01) + (-2.9979646E-04) \times X)$
 $F = +3.4400172E+02$ SIGNIFICANCE OF F = SIGNIFICANT $\sigma_c = +3.7593352E-02$
 $R = -2.8551175E-01$ SIGNIFICANCE OF R = SIGNIFICANT $S_e = +1.6163901E-05$
 $t = +1.8547283E+01$ SIGNIFICANCE OF t = SIGNIFICANT $S_c = +3.6033184E-02$
 $N = 3878$ DEGREES OF FREEDOM = 3876
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6.H.R. HYDROSTATIC STRAIN AT RUPTURE 1750 IN/MIN. 800 PSI

Figure 23

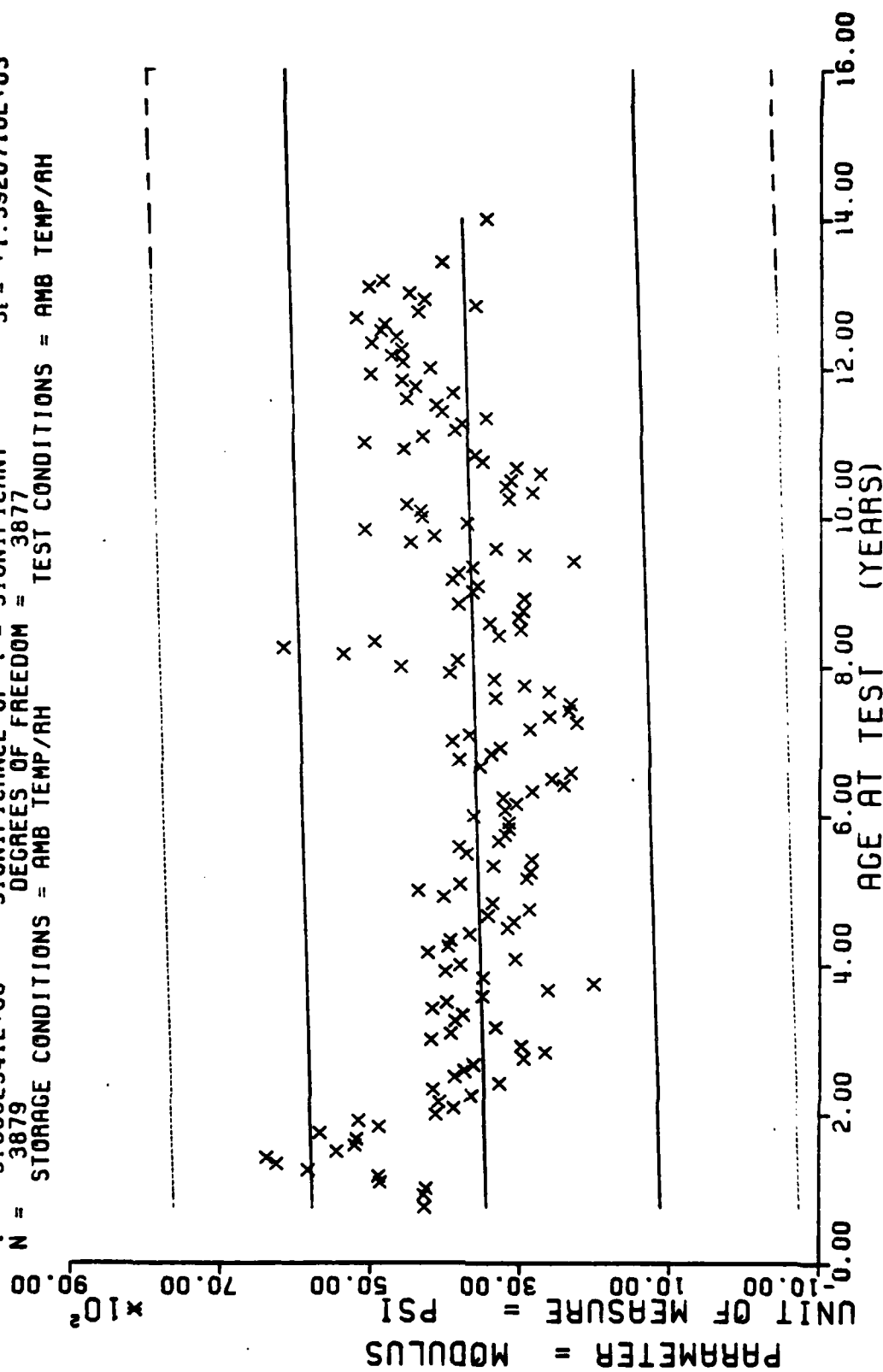
$Y = ((+4.5365227E+02) + (+4.9697336E-01) * X)$
 $F = +1.4898270E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +1.9234373E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +1.2205847E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 3880$ DEGREES OF FREEDOM = 3878
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



RING 6.H.R. HYDROSTATIC STRESS AT RUPTURE. 1750IN/MIN. 800 PSI

Figure 24

$Y = (1 + 3.4209446E+03) + (+2.3009328E+00) \times X$
 F = +1.3588322E+01 SIGNIFICANCE OF F = SIGNIFICANT $\sigma_t = +1.3943286E+03$
 R = +5.9098340E-02 SIGNIFICANCE OF R = SIGNIFICANT $S_e = +6.2419608E-01$
 I = +3.6862341E+00 SIGNIFICANCE OF I = SIGNIFICANT $S_t = +1.3920710E+03$
 N = 3879 DEGREES OF FREEDOM = 3877
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6.H.R. HYDROSTATIC MODULUS, 1750 IN/MIN, 800 PSI

Figure 25

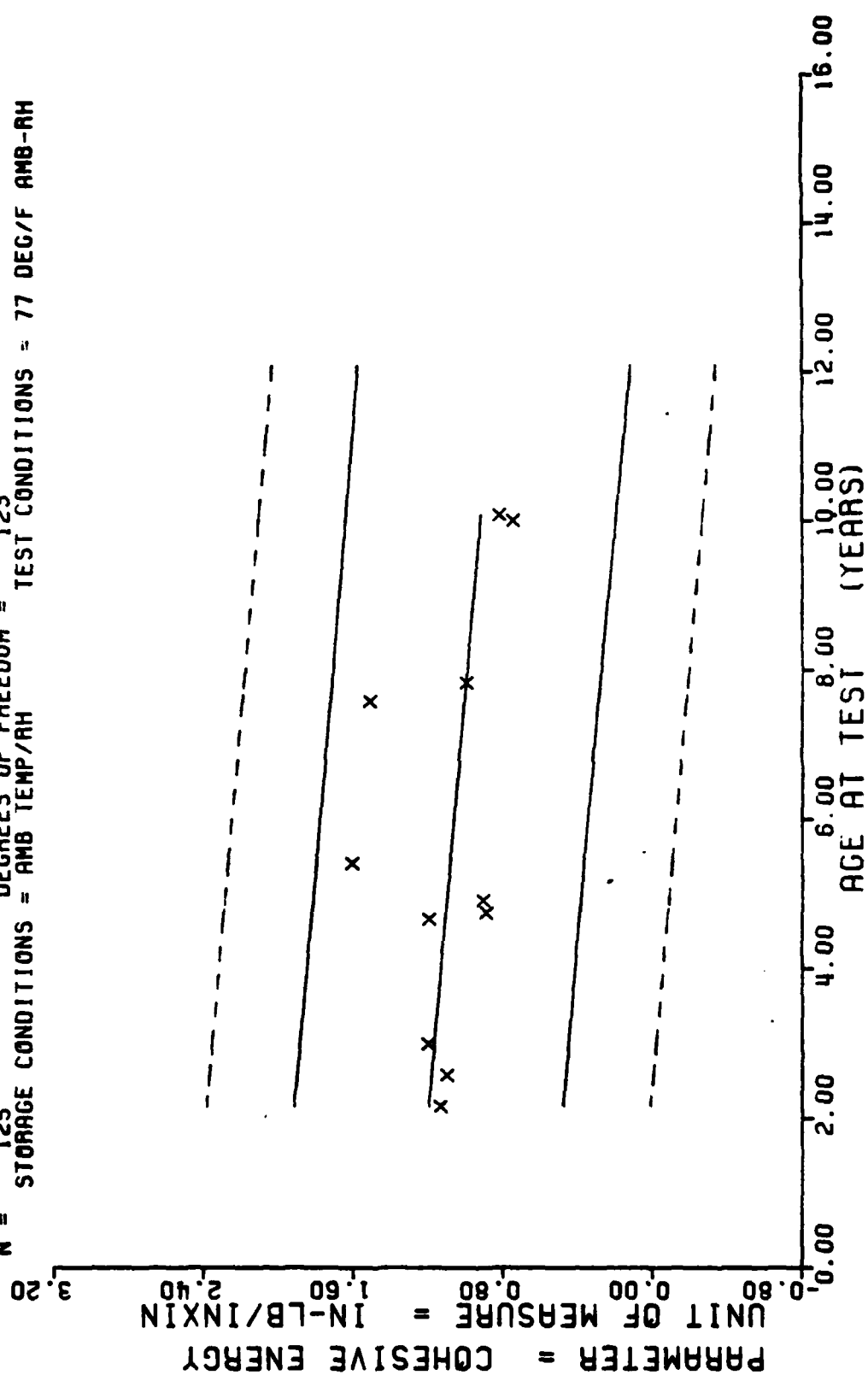
*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP
26	13
31	12
36	11
56	5
57	13
59	14
65	12
91	7
94	14
120	12
121	12

STAGE I WING C TP-H1011 TEAR ENERGY IFST/IFMP=77 DFG F

This sample size summary is applicable to figure 26

$F = +7.395993E+00$
 $R = -2.3815861E-01$
 $I = +2.7195586E+00$
 $N = 125$
 $Y = ((+1.2718053E+00) + (-2.9404487E-03) \times X)$
 SIGNIFICANCE OF F = SIGNIFICANT
 SIGNIFICANCE OF R = SIGNIFICANT
 SIGNIFICANCE OF I = SIGNIFICANT
 DEGREES OF FREEDOM = 123
 STORAGE CONDITIONS = AMB TEMP/AH
 TEST CONDITIONS = 77 DEG/F AMB-AH
 $\sigma_r = +4.0501268E-01$
 $S_o = +1.0812227E-03$
 $S_r = +3.9495474E-01$



STAGE I WING 6 TP-H1011 TEAR ENERGY TEST/TEMP=77 DEG F

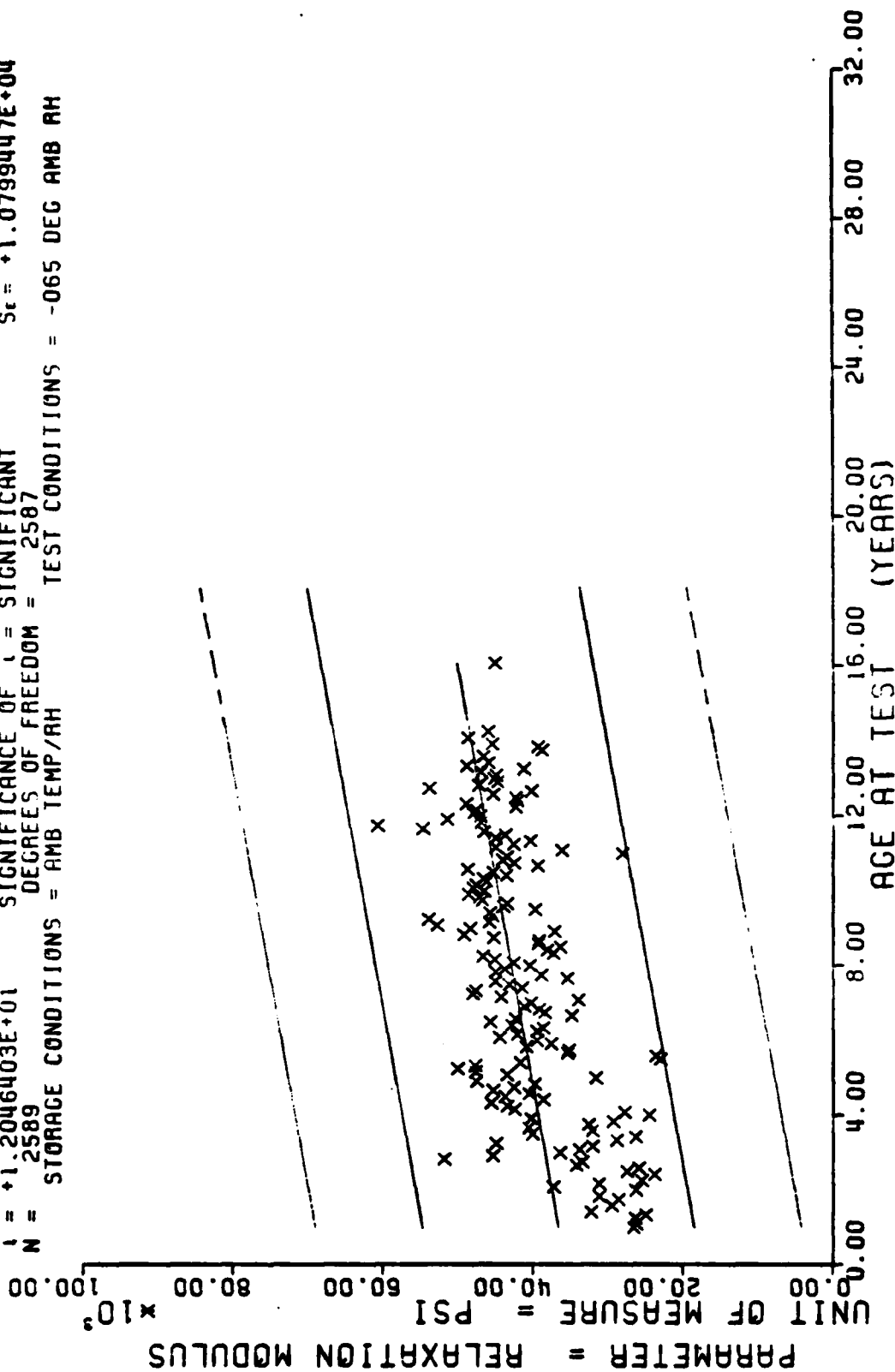
Figure 26

[illegible]

WING 6, STRESS RELAXATION MODULUS, 0.5% STRAIN, 10 SEC, -65 DEG F, TPH-1011

This sample size summary is applicable to figures 27 and 28

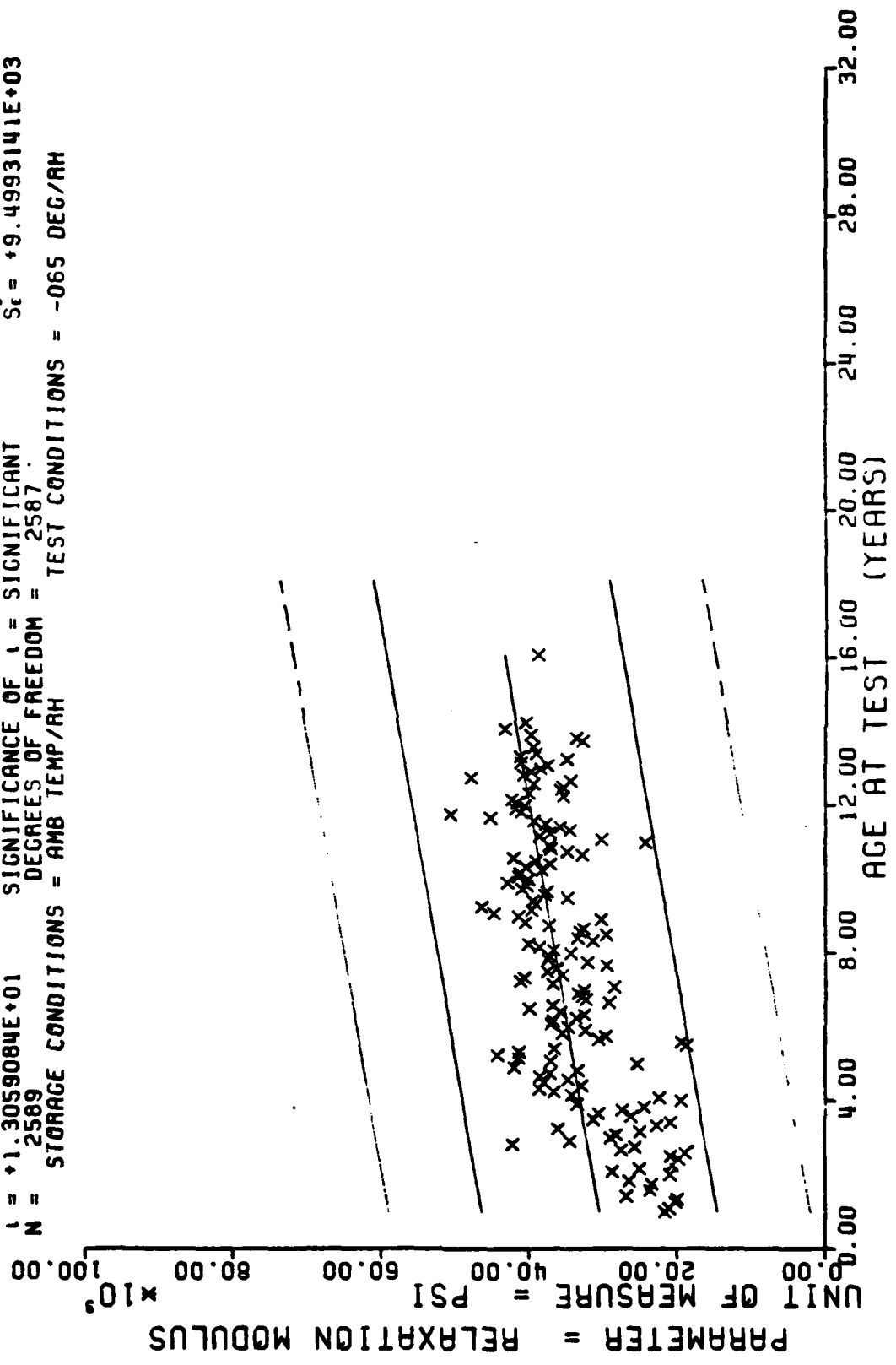
$Y = ((+3.5692837E+04) + (+7.4605632E+01) \cdot X)$
 $F = +1.4511584E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +2.3046653E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +1.2046403E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 2589$ DEGREES OF FREEDOM = 2587
 STORAGE CONDITIONS = AMB TEMP/AM TEST CONDITIONS = -065 DEG AMB RH



WING 6. STRESS RELAXATION MODULUS. 0.5% STRAIN. 10 SEC. -65 DEG F. TPH-1011

Figure 27

$Y = ((+2.9657148E+04) + (+7.1140621E+01) * X)$
 F = +1.7053970E+02 SIGNIFICANCE OF F = SIGNIFICANT $\sigma_1 = +9.8055284E+03$
 R = +2.4868629E-01 SIGNIFICANCE OF R = SIGNIFICANT $S_1 = +5.4475961E+00$
 t = +1.3059084E+01 SIGNIFICANCE OF t = SIGNIFICANT $S_2 = +9.4993141E+03$
 N = 2589 DEGREES OF FREEDOM = 2587
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = -065 DEG/AH



WING 6, STRESS RELAXATION MODULUS, 0.5% STRAIN, 50 SEC, -65 DEG F, TPH-1011

Figure 28

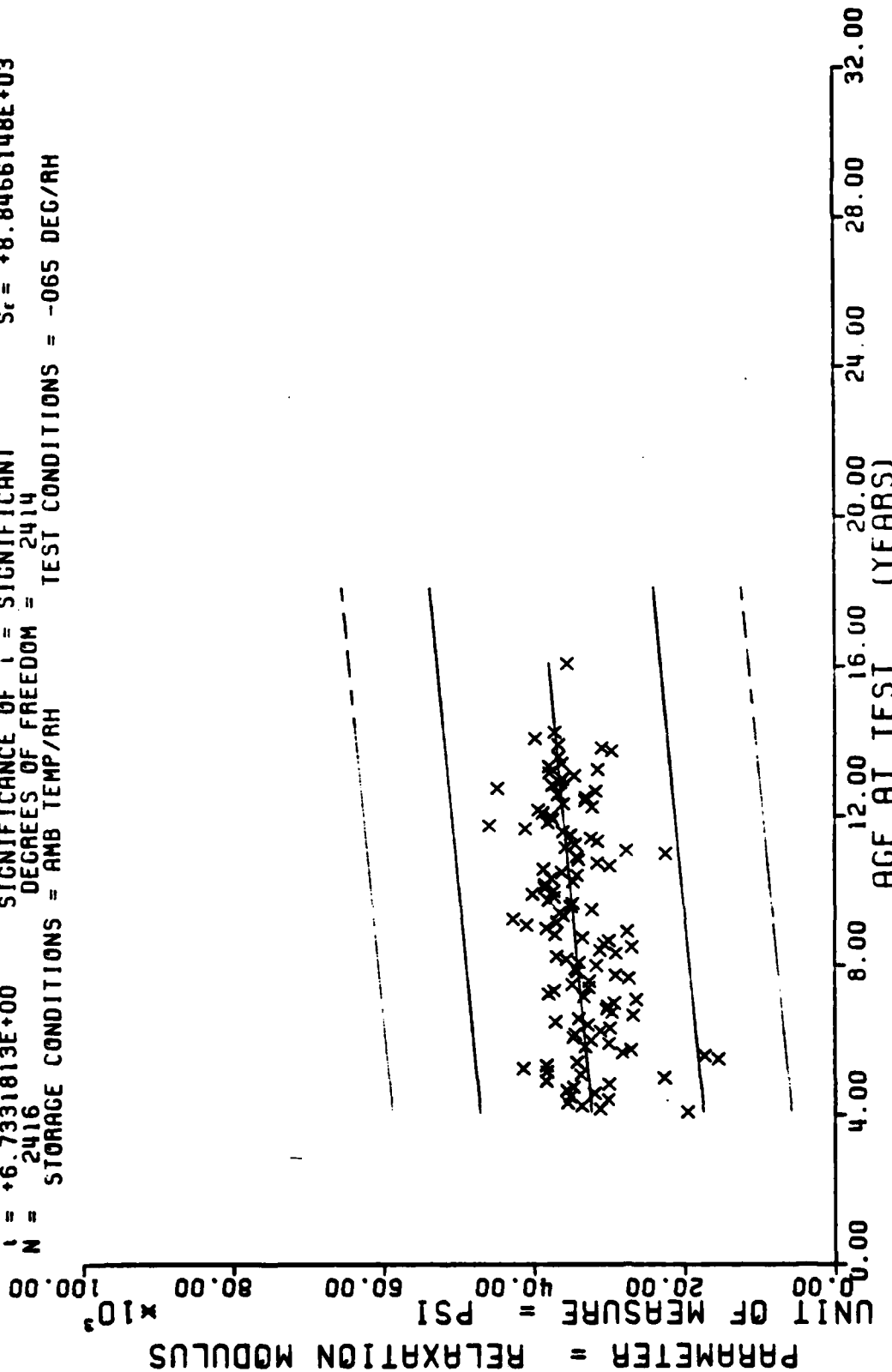
*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
49	2	74	32	99	41	124	27	149	12
50	26	75	32	100	23	125	20	150	3
51	49	76	17	101	27	126	21	151	12
52	46	77	40	102	8	127	12	152	3
53	18	78	28	103	18	128	23	153	32
54	27	79	15	104	12	129	2	154	6
55	27	80	17	105	9	130	36	155	6
56	21	81	23	106	3	131	36	156	6
57	24	82	35	107	9	132	8	157	6
58	20	83	12	108	15	133	18	158	3
59	9	84	17	109	15	134	28	159	3
60	9	85	18	110	9	135	18	160	3
61	21	86	9	111	6	136	2	161	15
62	46	87	33	112	17	137	9	163	3
63	23	88	19	113	45	138	34	165	3
64	30	89	21	114	35	139	45	166	6
65	9	90	30	115	46	140	6	167	6
66	2	91	14	116	36	141	12	169	3
67	9	92	9	117	27	142	18	171	3
68	9	93	25	118	21	143	38	193	3
69	20	94	26	119	19	144	9		
70	30	95	26	120	36	145	3		
71	41	96	51	121	21	146	6		
72	30	97	54	122	6	147	9		
73	39	98	55	123	6	148	3		

WING 6, STRESS RELAXATION MODULUS, 0.5% STRAIN, 1000 SEC, -65 DEG F, TPN-1011

This sample size summary is applicable to figures 29 and 30

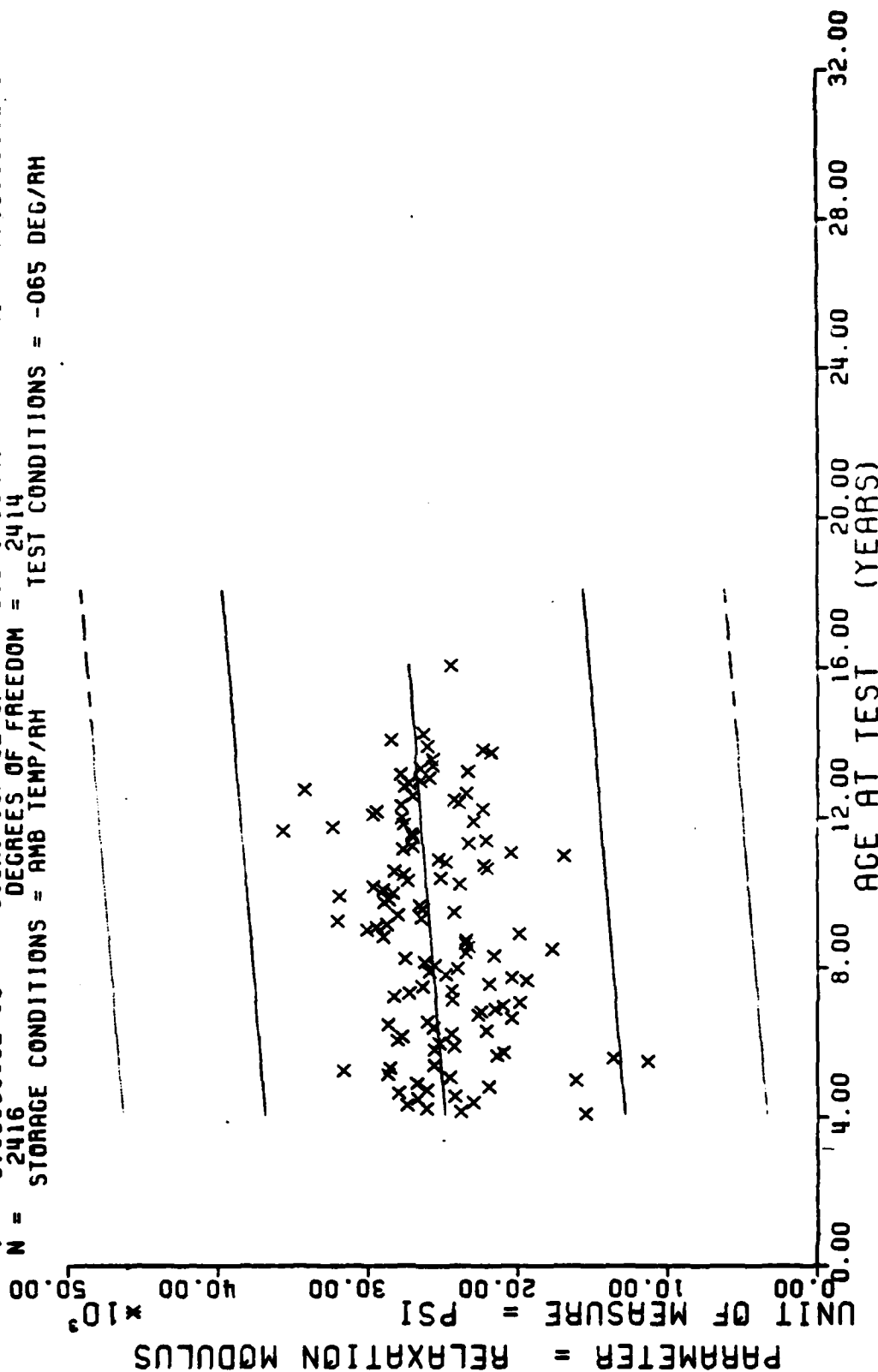
$Y = ((+3.0392575E+04) + (+3.9108005E+01) * X)$
 $F = +4.5335730E+01$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +1.3577237E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +6.7331813E+00$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 2416$ DEGREES OF FREEDOM = 2414
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = -065 DEG/RH



WING 6. STRESS RELAXATION MODULUS, 0.5% STRAIN, 100 SEC, -65 DEG F, IPH-1011

Figure 29

$Y = ((+2.4023328E+04) + (+1.6594980E+01) \times X)$
 SIGNIFICANCE OF F = SIGNIFICANT
 $G = +7.1705288E+03$
 SIGNIFICANCE OF R = SIGNIFICANT
 $S_0 = +4.6966611E+00$
 SIGNIFICANCE OF I = SIGNIFICANT
 $S_t = +7.1535395E+03$
 DEGREES OF FREEDOM = 2414
 STORAGE CONDITIONS = AMB TEMP/RH
 TEST CONDITIONS = -065 DEG/RH



WING 6. STRESS RELAXATION MODULUS 0.5% STRAIN, 1000 SEC. -65 DEG F. IPH-1011

Figure 30

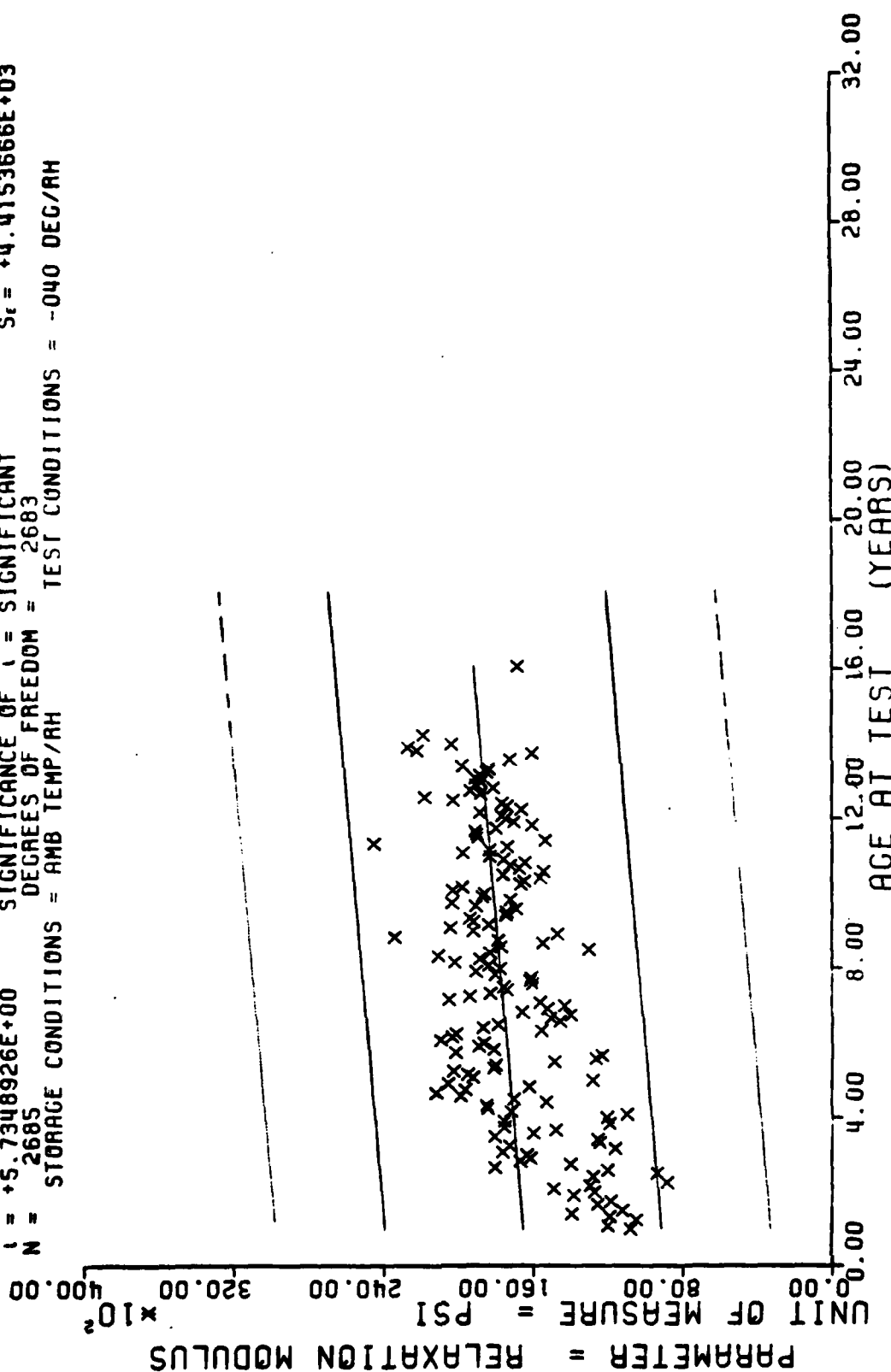
*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
12	3	41	2	66	6	91	18	116	49	141	15	141	15
13	3	42	9	67	6	92	24	117	21	142	30	142	30
15	3	43	9	68	12	93	18	118	21	143	40	143	40
16	3	44	3	69	21	94	22	119	15	144	9	144	9
17	7	45	6	70	30	95	21	120	32	145	6	145	6
18	3	46	3	71	44	96	57	121	21	146	3	146	3
20	3	47	9	72	36	97	68	122	6	147	12	147	12
21	6	48	3	73	35	98	54	123	11	148	3	148	3
23	3	49	6	74	24	99	42	124	16	149	12	149	12
24	2	50	27	75	28	100	21	125	16	150	3	150	3
25	6	51	51	76	29	101	24	126	19	151	15	151	15
26	7	52	47	77	36	102	6	127	47	152	6	152	6
27	2	53	14	78	35	103	21	128	20	153	6	153	6
29	8	54	30	79	15	104	15	129	1	154	9	154	9
30	3	55	18	80	19	105	5	130	33	155	6	155	6
31	6	56	12	81	24	106	3	131	51	156	9	156	9
32	3	57	27	82	33	107	9	132	9	157	9	157	9
33	6	58	19	83	9	108	16	133	15	158	6	158	6
34	6	59	9	84	24	109	12	134	43	159	6	159	6
35	3	60	12	85	21	110	9	135	15	160	9	160	9
36	18	61	20	86	15	111	6	136	3	161	15	161	15
37	9	62	48	87	30	112	21	137	18	163	3	163	3
38	5	63	24	88	23	113	59	138	41	165	3	165	3
39	6	64	24	89	21	114	37	139	51	166	6	166	6
40	12	65	5	90	29	115	60	140	9	167	6	167	6
										168	3	168	3
										171	3	171	3
										193	3	193	3

WING 6. STRESS RELAXATION MODULUS .0.5% STRAIN, 10 SEC. - 40 DEG F. TPH-1011

This sample size summary is applicable to figures 31 thru 34

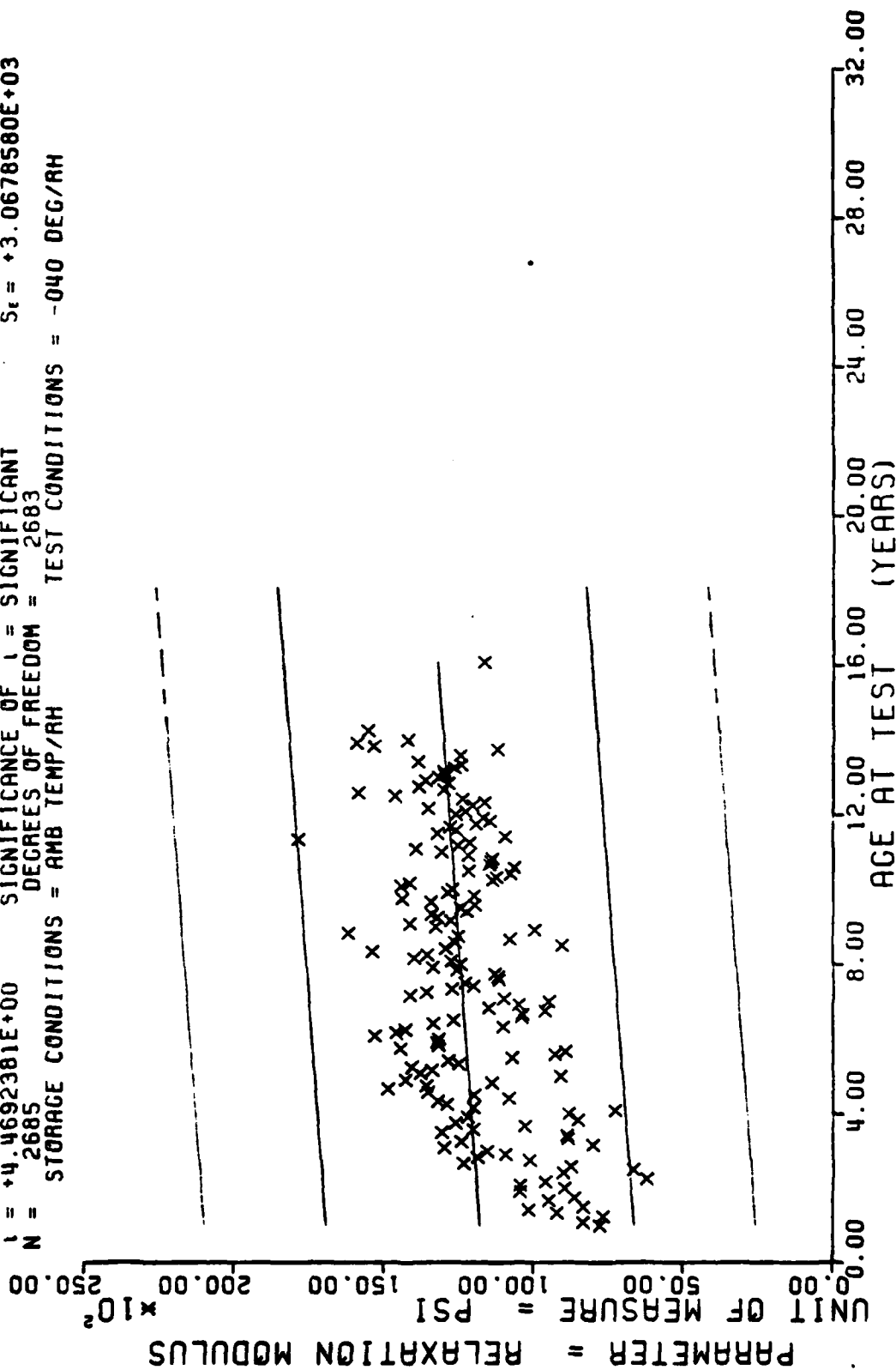
$Y = ((+1.6344157E+04) + (+1.4408862E+01) * X)$
 $F = +3.2888994E+01$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +1.1004473E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +5.7348926E+00$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 2685$ DEGREES OF FREEDOM = 2683
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = -040 DEG/AH



WING 6 STRESS RELAXATION MODULUS, 0.5% STRAIN, 10 SEC. -40 DEG F. (PH-1011)

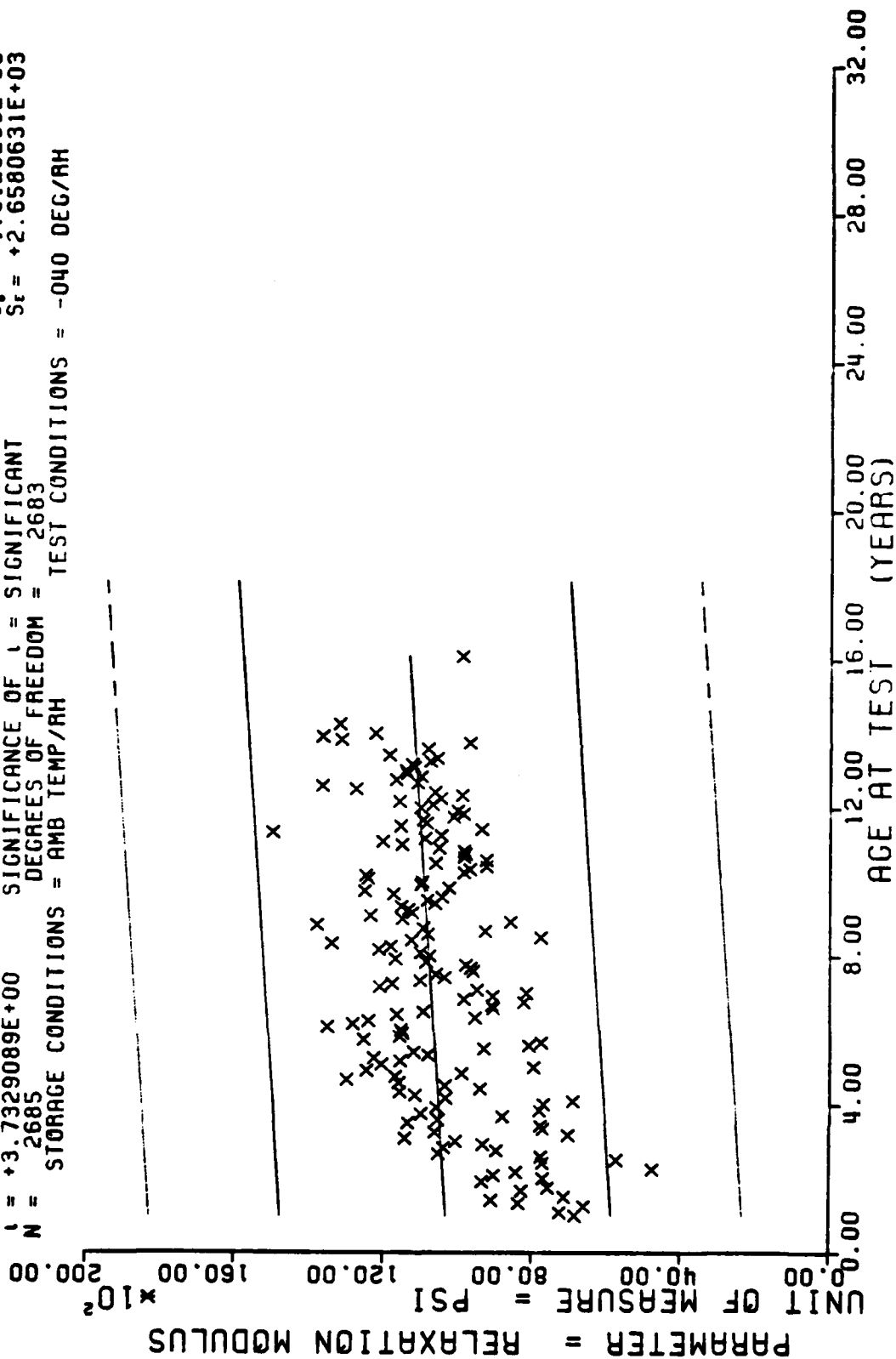
Figure 31

$Y = ((+1.1682803E+04) + (+7.8020082E+00) * X)$
 $F = +1.9974089E+01$ SIGNIFICANCE OF F = SIGNIFICANT $\sigma_1 = +3.0786828E+03$
 $R = +8.5963195E-02$ SIGNIFICANCE OF R = SIGNIFICANT $S_0 = +1.7457132E+00$
 $I = +4.4692381E+00$ SIGNIFICANCE OF I = SIGNIFICANT $S_e = +3.0678580E+03$
 $N = 2685$ DEGREES OF FREEDOM = 2683
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = -040 DEG/AH



WING 6. STRESS RELAXATION MODULUS, 0.5% STRAIN, 50 SEC. -40 DEG F, TPH-1011

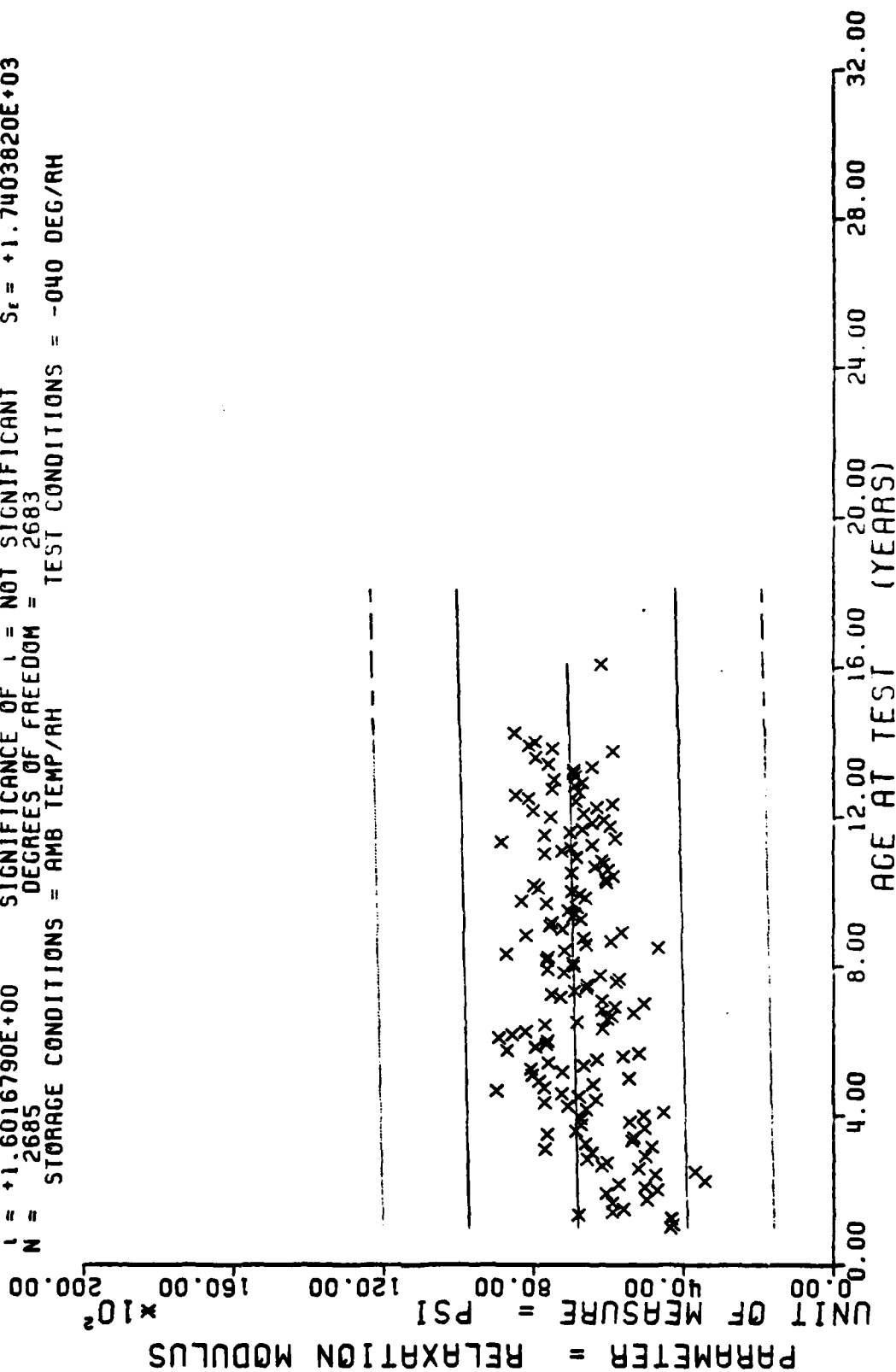
$Y = ((+1.0239969E+04) + (+5.6461230E+00) \times X)$
 $F = +1.3934609E+01$ SIGNIFICANCE OF F = SIGNIFICANT $\sigma_r = +2.6644602E+03$
 $R = +7.1880682E-02$ SIGNIFICANCE OF R = SIGNIFICANT $S_o = +1.5125263E+00$
 $t = +3.7329089E+00$ SIGNIFICANCE OF t = SIGNIFICANT $S_t = +2.6580631E+03$
 $N = 2685$ DEGREES OF FREEDOM = 2683
 STORAGE CONDITIONS = AMB TEMP/AM TEST CONDITIONS = -040 DEG/AM



WING 6. STRESS RELAXATION MODULUS, 0.5% STRAIN, 100 SEC, -40 DEG F, (PH-1011)

Figure 33

$Y = ((+6.7875679E+03) + (+1.5861992E+00) * X)$
 $F = +2.5653759E+00$ SIGNIFICANCE OF F = NOT SIGNIFICANT $G_1 = +1.7408895E+03$
 $R = +3.0907056E-02$ SIGNIFICANCE OF R = NOT SIGNIFICANT $S_1 = +9.9033526E-01$
 $I = +1.6016790E+00$ SIGNIFICANCE OF I = NOT SIGNIFICANT $S_2 = +1.7403820E+03$
 $N = 2685$ DEGREES OF FREEDOM = 2683
 STORAGE CONDITIONS = AMB TEMP/AM TEST CONDITIONS = -040 DEG/RH



WING 6. STRESS RELAXATION MODULUS, 0.5% STRAIN, 1000 SEC, -40 DEG F, TPH-1011

*** SAMPLE SIZE SUMMARY ***

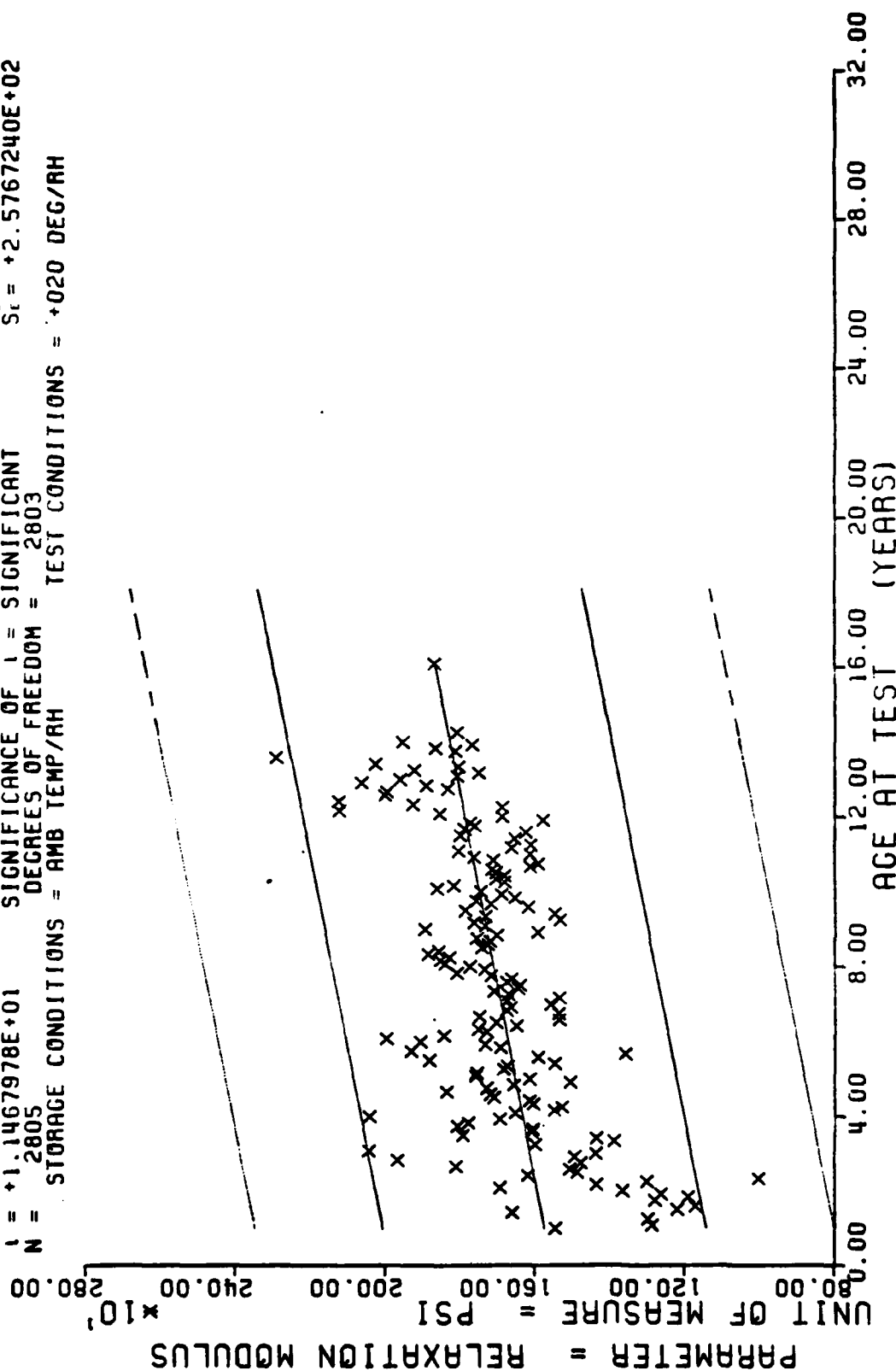
AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
12	3	41	3	66	9	91	21	116	51	142	27	142	27
13	3	42	15	67	10	92	21	117	21	143	26	143	26
15	6	43	9	68	9	93	21	118	21	144	9	144	9
17	7	44	3	69	29	94	21	119	27	145	6	145	6
18	3	45	6	70	24	95	32	120	30	146	6	146	6
19	9	46	6	71	46	96	57	121	21	147	12	147	12
21	5	47	9	72	42	97	57	122	9	148	3	148	3
22	6	48	3	73	24	98	54	123	12	149	12	149	12
23	6	49	6	74	39	99	42	124	23	151	15	151	15
24	6	50	27	75	38	100	21	125	18	152	6	152	6
25	6	51	59	76	26	101	27	126	20	153	6	153	6
26	6	52	48	77	37	102	8	127	14	154	9	154	9
27	6	53	15	78	36	103	21	128	24	155	6	155	6
28	3	54	32	79	18	104	5	129	3	156	9	156	9
29	5	55	18	80	24	105	9	130	33	157	9	157	9
30	3	56	18	81	39	106	3	131	54	158	6	158	6
31	9	57	30	82	27	107	12	132	15	159	6	159	6
32	3	58	16	83	15	108	18	133	9	160	9	160	9
33	12	59	6	84	27	109	9	134	42	161	15	161	15
34	6	60	22	85	12	110	5	135	15	163	3	163	3
35	5	61	21	86	21	111	6	137	18	165	3	165	3
36	24	62	49	87	26	112	36	138	26	166	6	166	6
37	5	63	24	88	24	113	53	139	66	167	6	167	6
39	12	64	27	89	24	114	41	140	12	168	3	168	3
40	8	65	12	90	36	115	48	141	12	171	3	171	3
										193	3	193	3

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WING 6. STRESS RELAXATION MODULUS. 3.0% STRAIN. 10 SEC. 20 DEC F.TPH-1011

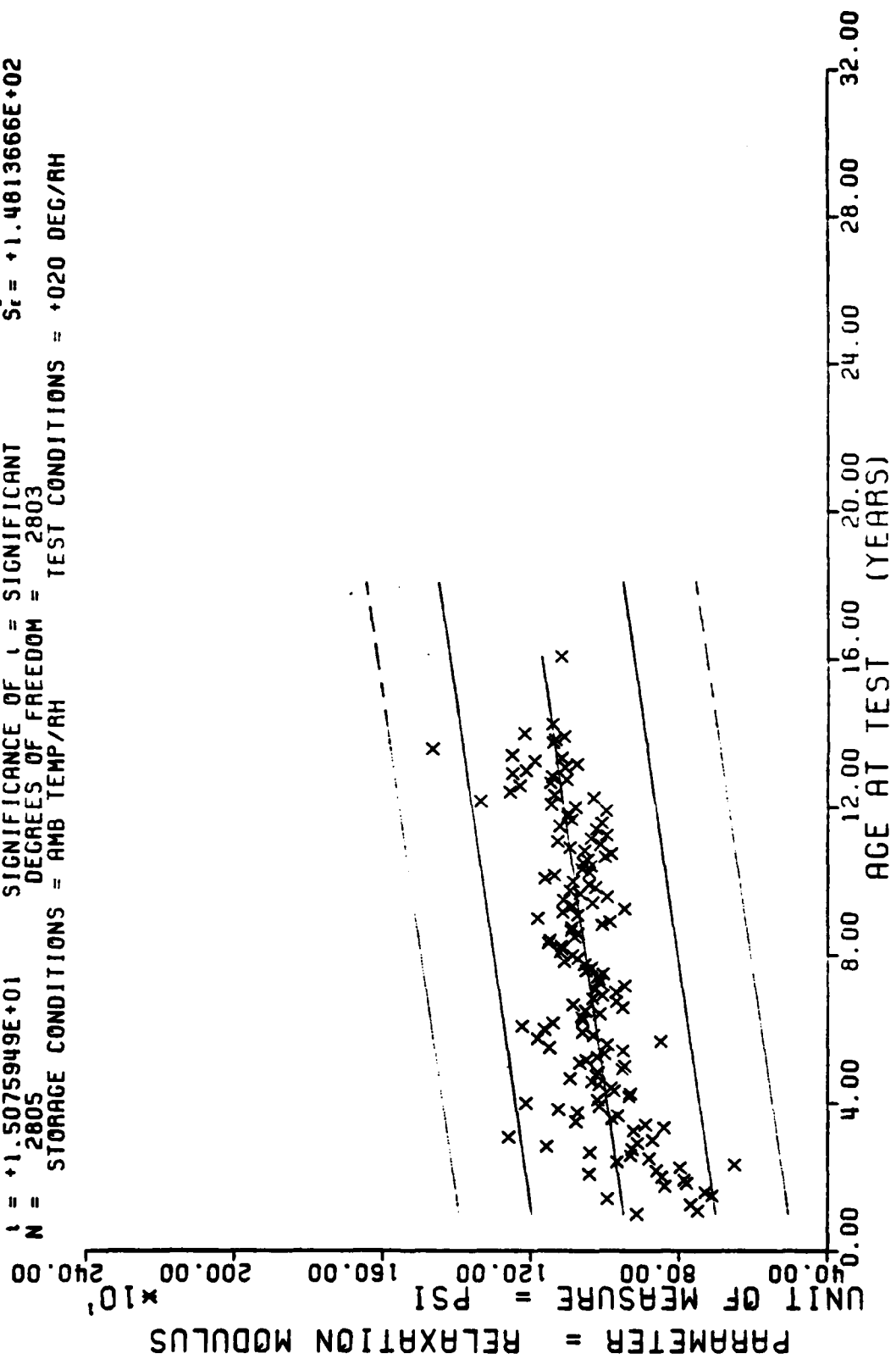
This sample size summary is applicable to figures 35 thru 38

$F = +1.3151452E+02$
 $R = +2.1169896E-01$
 $I = +1.1467978E+01$
 $N = 2805$
 $Y = ((+1.5552754E+03) + (+1.6173060E+00) \times X)$
 SIGNIFICANCE OF F = SIGNIFICANT
 SIGNIFICANCE OF R = SIGNIFICANT
 SIGNIFICANCE OF I = SIGNIFICANT
 DEGREES OF FREEDOM = 2803
 STORAGE CONDITIONS = AMB TEMP/RH
 TEST CONDITIONS = +020 DEG/RH



WING 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 10 SEC. 20 DEG F, JPH-1011

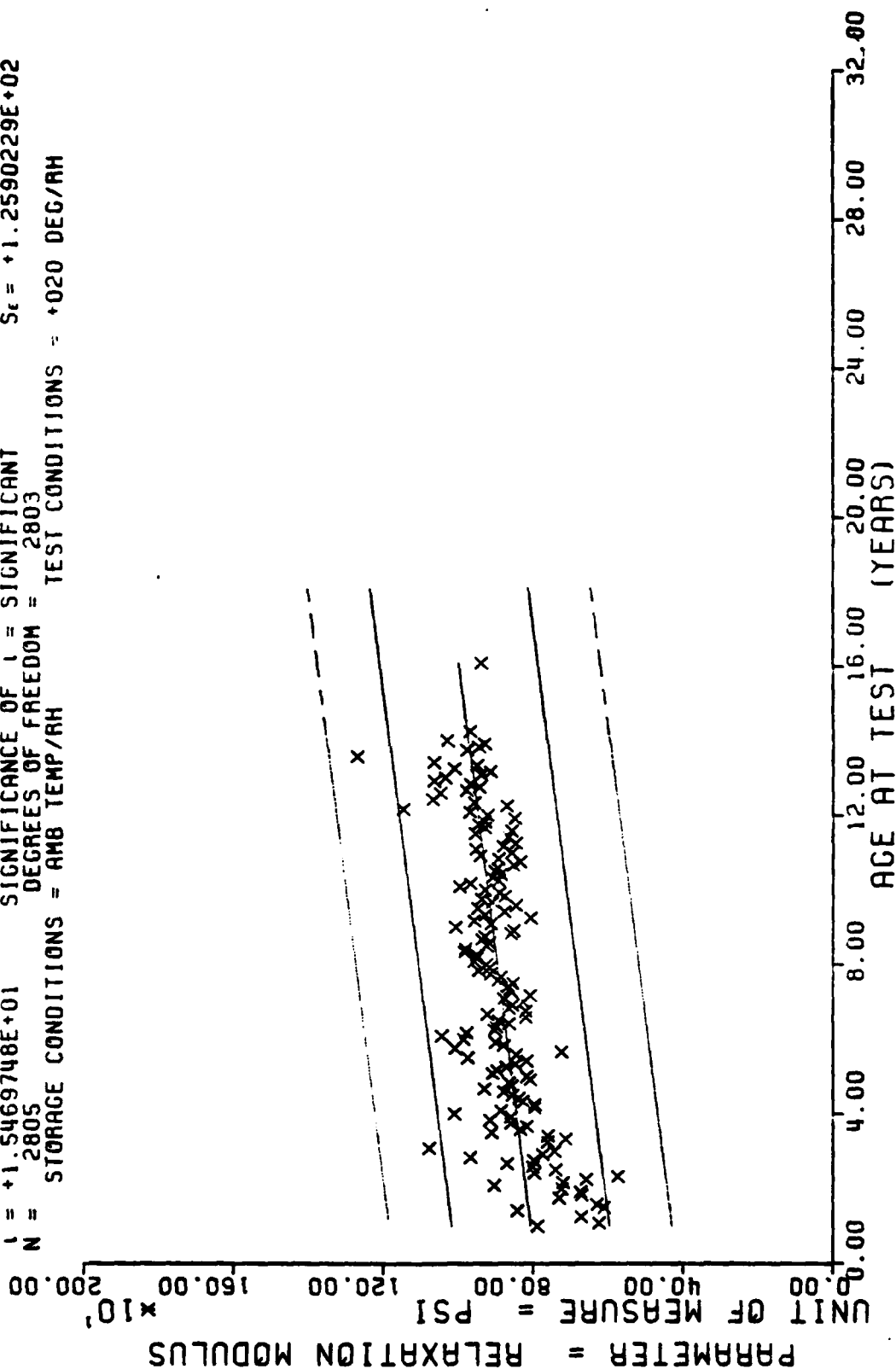
$Y = ((+9.3483930E+02) + (+1.2223193E+00) \times X)$
 $F = +2.2728425E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +2.7386907E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +1.5075949E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 2805$ DEGREES OF FREEDOM = 2803
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +020 DEG/RH
 $\sigma_r = +1.5399806E+02$
 $S_b = +8.1077438E-02$
 $S_r = +1.4813666E+02$



WING 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 50 SEC. 20 DEG F. (PH-1011)

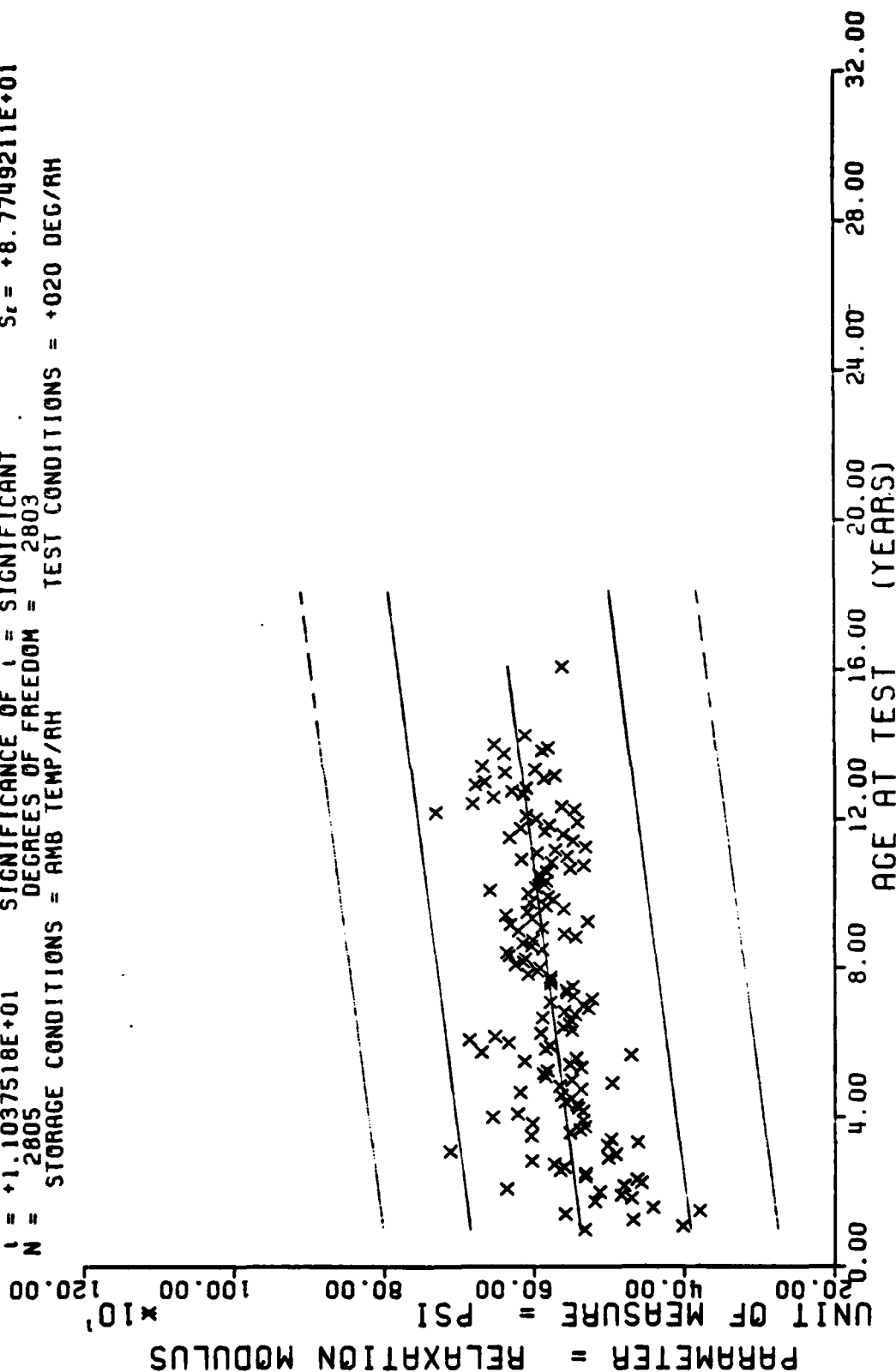
Figure 36

$Y = ((+7.9410898E+02) + (+1.0659929E+00) \times X)$
 $F = +2.3931310E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +2.8046668E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +1.5469748E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 2805$ DEGREES OF FREEDOM = 2803
 STORAGE CONDITIONS = AMB TEMP/AM TEST CONDITIONS = +020 DEG/AM



WING 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 100 SEC. 20 DEG F. IPH-1011

$Y = ((+5.3228883E+02) + (+5.3009305E-01) * X)$
 $F = +1.2182681E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +2.0408982E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +1.1037518E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 2805$ DEGREES OF FREEDOM = 2803
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +020 DEG/RH



WING 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 1000 SEC. 20 DEG F, TPH-1011

Figure 38

*** SAMPLE SIZE SUMMARY ***

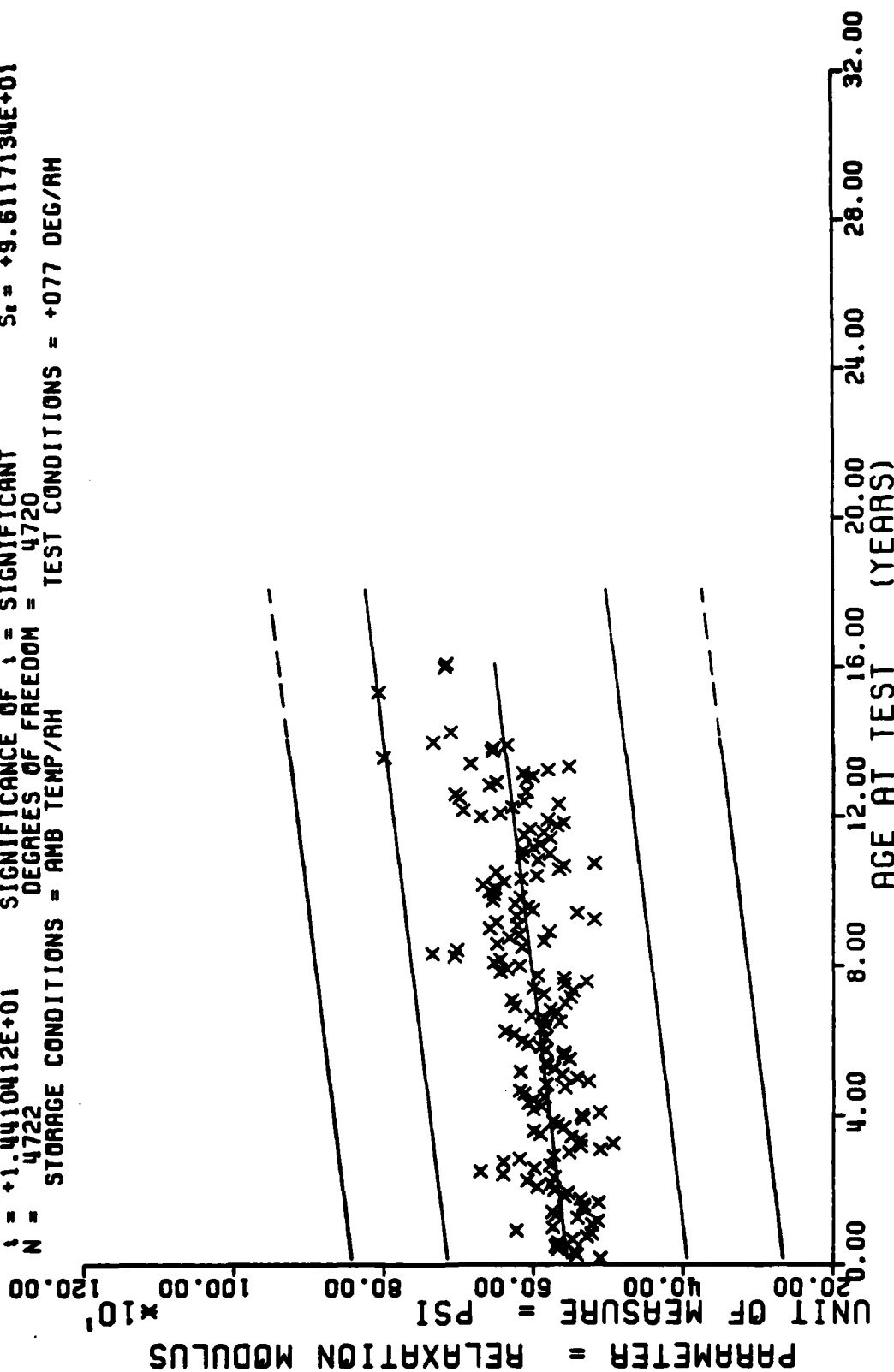
AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
2	3	27	24	52	72	77	33	102	15	127	15	127	15
3	6	28	27	53	18	78	39	103	26	128	24	128	24
4	18	29	48	54	39	79	21	104	12	129	3	129	3
5	22	30	43	55	22	80	21	105	6	130	42	130	42
6	21	31	30	56	36	81	45	106	3	131	42	131	42
7	35	32	60	57	51	82	21	107	10	132	14	132	14
8	30	33	29	58	45	83	15	108	24	133	9	133	9
9	45	34	51	59	39	84	21	109	9	134	36	134	36
10	38	35	36	60	74	85	15	110	9	135	15	135	15
11	37	36	58	61	66	86	21	111	9	137	15	137	15
12	65	37	18	62	82	87	36	112	30	138	45	138	45
13	51	38	24	63	63	88	21	113	56	139	48	139	48
14	46	39	42	64	51	89	30	114	44	140	9	140	9
15	57	40	18	65	36	90	42	115	27	141	12	141	12
16	36	41	24	66	39	91	14	116	65	142	27	142	27
17	46	42	12	67	33	92	23	117	18	143	30	143	30
18	13	43	9	68	51	93	19	118	21	144	6	144	6
19	10	44	9	69	75	94	18	119	21	145	3	145	3
20	4	45	6	70	99	95	33	120	33	146	6	146	6
21	27	46	18	71	62	96	57	121	15	147	9	147	9
22	9	47	30	72	51	97	69	122	9	148	3	148	3
23	6	48	36	73	33	98	60	123	9	149	6	149	6
24	34	49	42	74	48	99	39	124	24	150	6	150	6
25	27	50	30	75	39	100	20	125	18	151	12	151	12
26	30	51	81	76	27	101	34	126	22	154	9	154	9
										155	3	155	3
										156	6	156	6
										157	6	157	6
										158	6	158	6
										160	3	160	3
										161	15	161	15
										163	3	163	3
										165	3	165	3
										166	6	166	6
										167	6	167	6
										168	3	168	3
										171	3	171	3

WING 6-STRESS RELAXATION MODULUS, 3.0% STRAIN, 1000 SEC. 77 DEG F. TPH-1011

This sample size summary is applicable to figures 39 thru 42

184 3
192 1
193 2

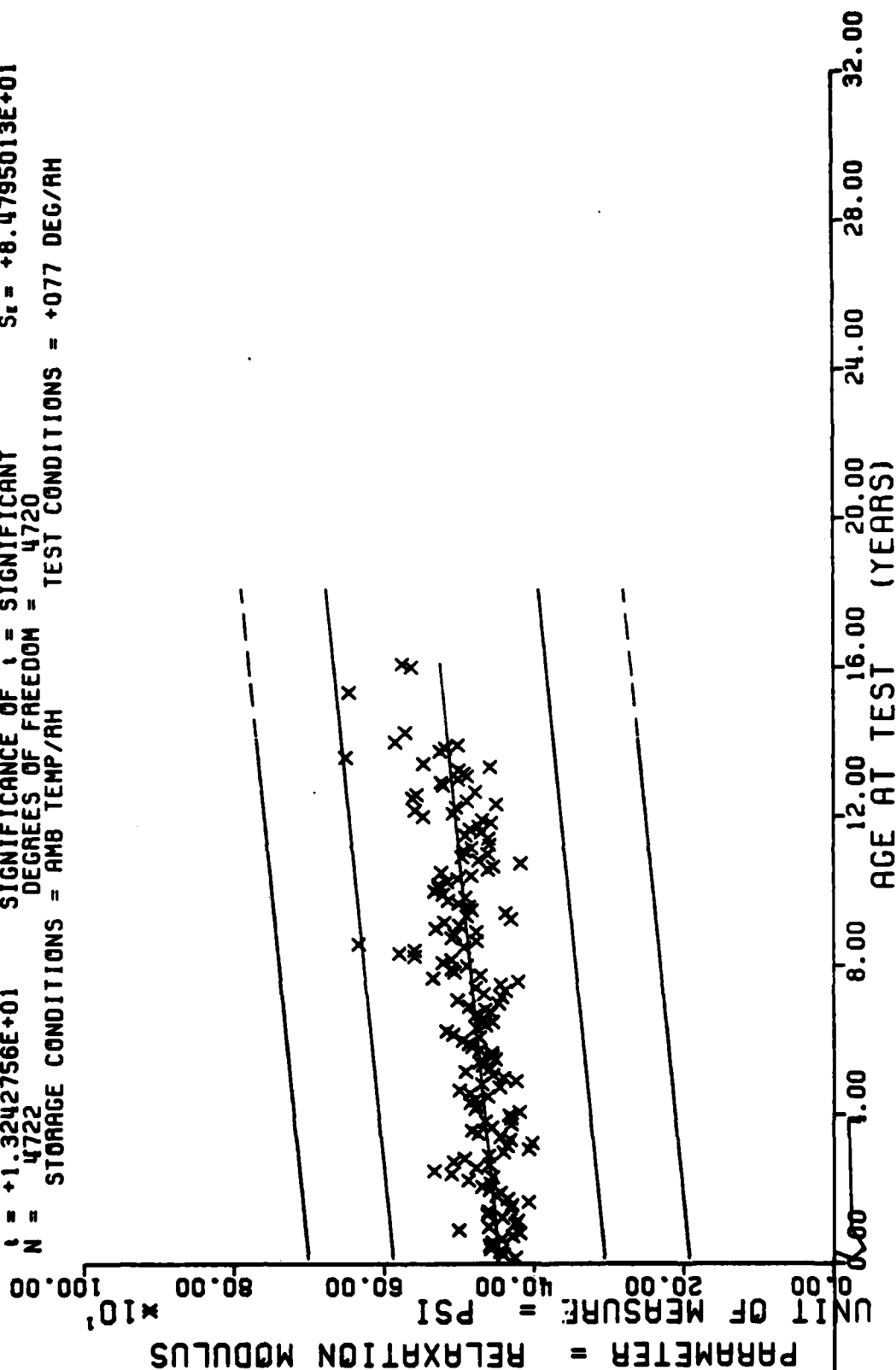
$Y = ((+5.5431100E+02) + (+5.0078767E-01) \times X)$
 $F = +2.0765997E+02$ SIGNIFICANCE OF F = SIGNIFICANT $\sigma_e = +9.8198348E+01$
 $R = +2.0528444E-01$ SIGNIFICANCE OF R = SIGNIFICANT $S_e = +3.4751793E-02$
 $t = +1.4410412E+01$ SIGNIFICANCE OF t = SIGNIFICANT $S_e = +9.6117134E+01$
 $N = 4722$ DEGREES OF FREEDOM = 4720
 STORAGE CONDITIONS = AMB TEMP/AM TEST CONDITIONS = +077 DEG/AM



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 10 SEC, 77 DEG F, TPH-1011

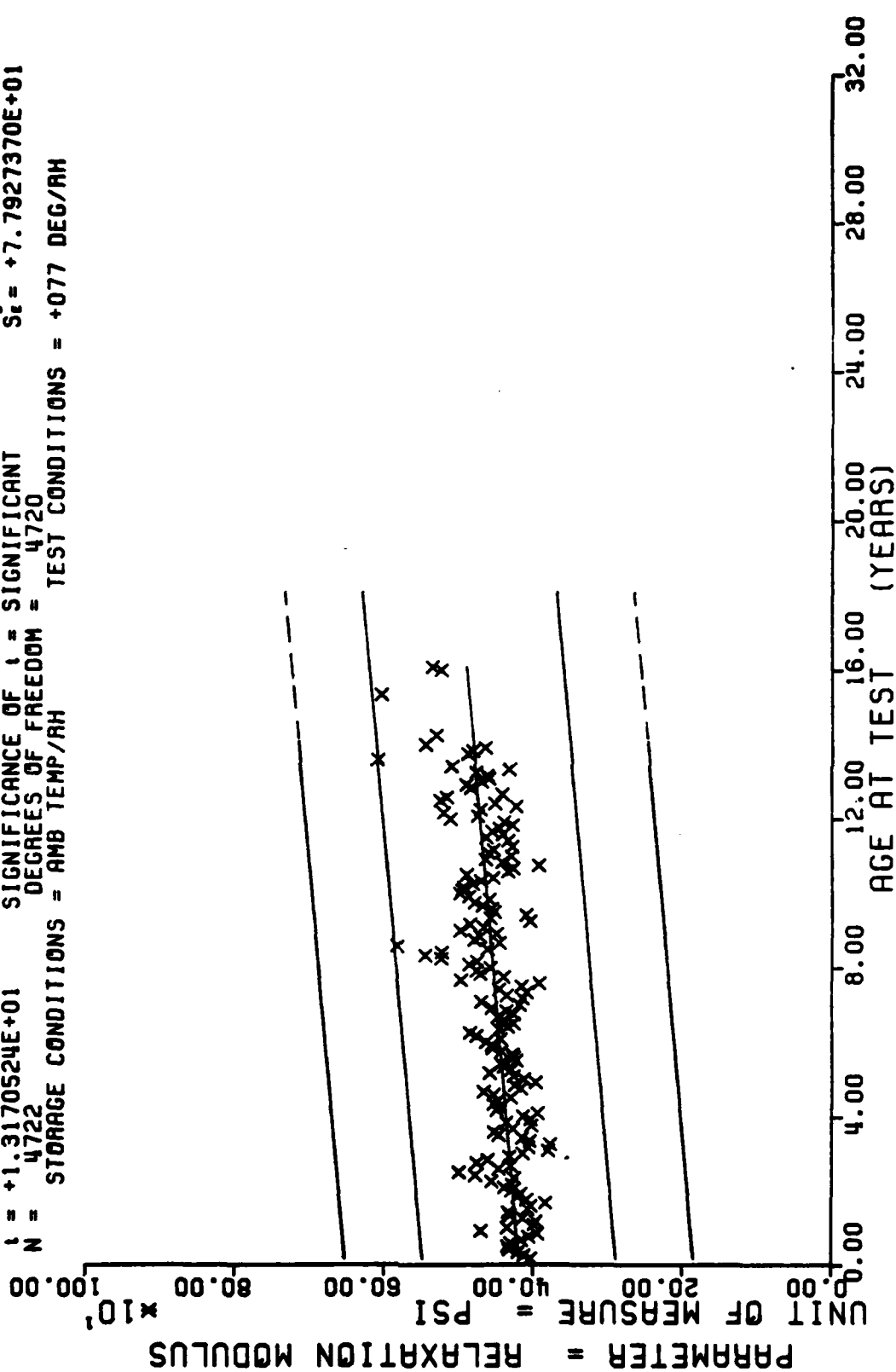
Figure 39

$F = +1.7537060E+02$ SIGNIFICANCE OF F = SIGNIFICANT $G_r = +8.6346770E+01$
 $R = +1.8927167E-01$ SIGNIFICANCE OF R = SIGNIFICANT $S_o = +3.0658205E-02$
 $t = +1.3242756E+01$ SIGNIFICANCE OF t = SIGNIFICANT $S_r = +8.4795013E+01$
 $N = 4722$ DEGREES OF FREEDOM = 4720
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +077 DEG/RH



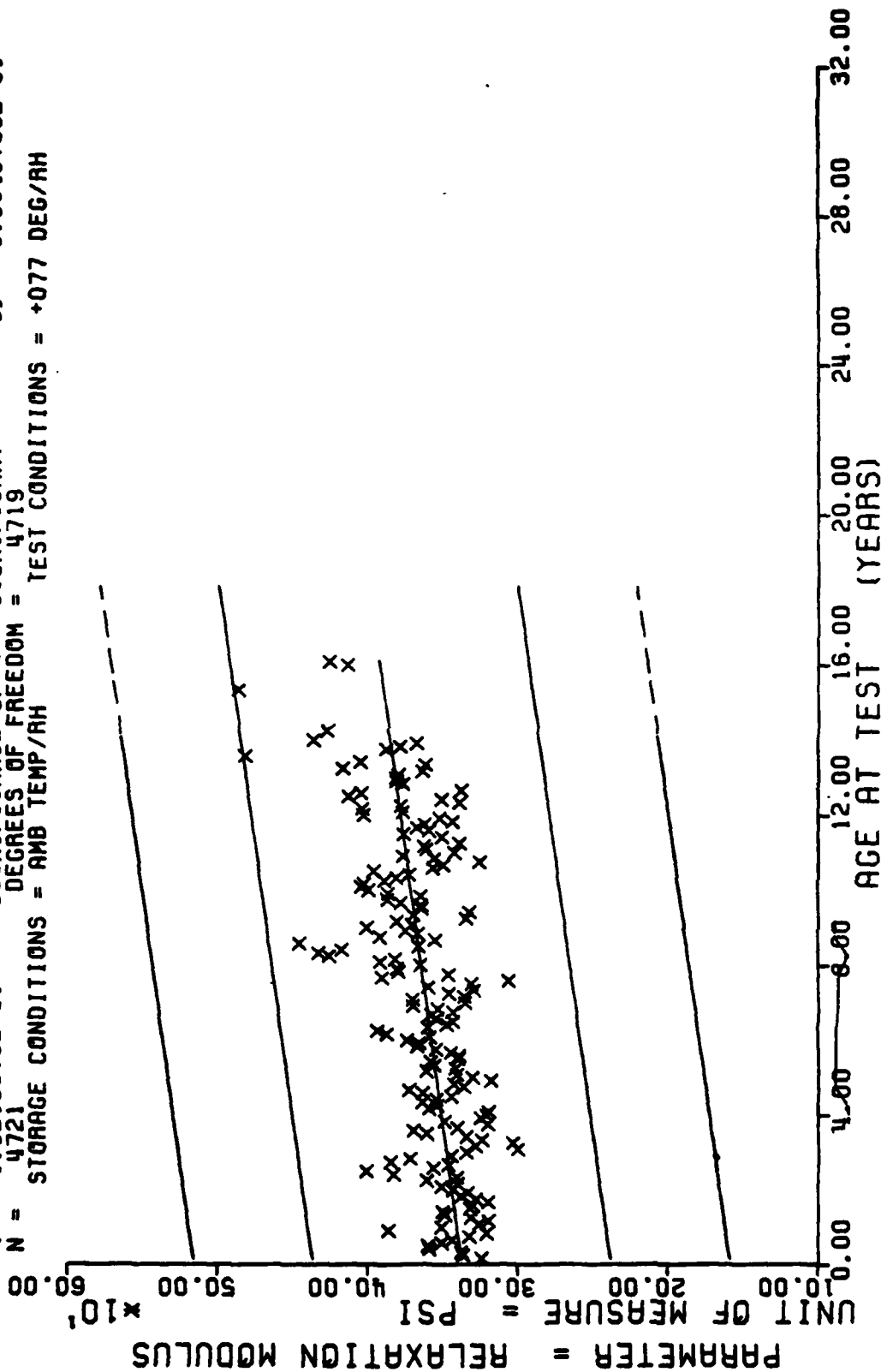
WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 50 SEC. 77 DEG F, TPH-1011

$Y = ((+4.1794073E+02) + (+3.7108166E-01) \times X)$
 $F = +1.7346271E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +1.8827598E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +1.3170524E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 4722$ DEGREES OF FREEDOM = 4720
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +077 DEG/RH
 $G_f = +7.9337984E+01$
 $S_o = +2.8175162E-02$
 $S_e = +7.7927370E+01$



WING 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 100 SEC, 77 DEG F, TPH-1011

$Y = ((+3.3724062E+02) + (+2.8443214E-01) * X)$
 $F = +1.7452725E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +1.8885157E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +1.3210876E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 4721$ DEGREES OF FREEDOM = 4719
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = +077 DEG/AH
 $\sigma_r = +6.0631512E+01$
 $S_e = +2.1530149E-02$
 $S_e = +5.9546795E+01$



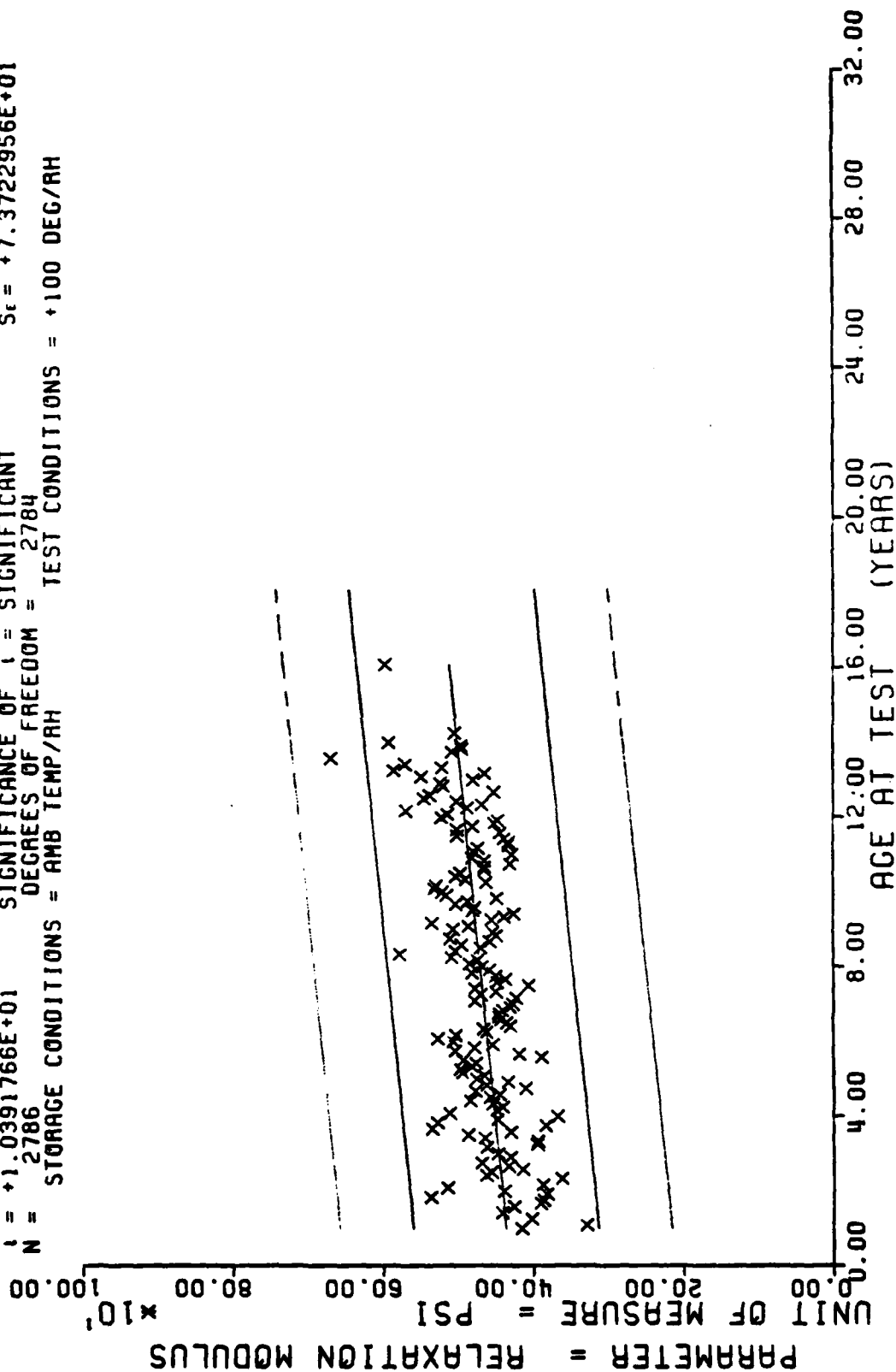
WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 1000 SEC, 77 DEG F, TPH-1011

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
12	3	43	9	68	12	93	21	118	21	143	30
13	3	44	3	69	24	94	21	119	21	144	12
15	6	45	9	70	27	95	27	120	36	145	6
17	15	46	6	71	48	96	60	121	18	146	6
19	6	47	9	72	42	97	57	122	9	147	12
20	3	48	3	73	24	98	60	123	15	148	3
21	9	49	6	74	42	99	39	124	21	149	9
22	6	50	27	75	36	100	21	125	15	150	6
23	3	51	57	76	29	101	24	126	24	151	15
24	6	52	45	77	33	102	9	127	14	152	6
25	9	53	12	78	36	103	21	128	21	154	12
26	9	54	28	79	18	104	9	129	3	155	3
28	3	55	27	80	24	105	9	130	42	156	6
29	9	56	27	81	39	106	3	131	45	157	12
30	9	57	31	82	27	107	8	132	9	158	9
31	3	58	24	83	18	108	21	133	15	159	3
32	5	59	12	84	21	109	9	134	39	160	9
33	9	60	15	85	12	110	9	135	12	161	15
35	15	61	20	86	18	111	5	136	6	163	3
36	24	62	48	87	18	112	33	137	21	165	3
38	6	63	21	88	14	113	51	138	51	166	6
39	9	64	33	89	18	114	44	139	51	167	6
40	9	65	9	90	30	115	30	140	21	168	3
41	12	66	12	91	24	116	36	141	18	171	3
42	6	67	6	92	24	117	21	142	27	193	3

WING 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 10 SEC, 1 CO DEG F, TPH-1011

This sample size summary is applicable to figures 43 thru 46

$Y = ((+4.3143682E+02) + (+4.1448105E-01) * X)$
 $F = +1.0798880E+02$ SIGNIFICANCE OF F = SIGNIFICANT $\sigma_1 = +7.5125684E+01$
 $R = +1.9323734E-01$ SIGNIFICANCE OF R = SIGNIFICANT $S_0 = +3.9885525E-02$
 $t = +1.0391766E+01$ SIGNIFICANCE OF t = SIGNIFICANT $S_e = +7.3722956E+01$
 $N = 2786$ DEGREES OF FREEDOM = 2784
 STORAGE CONDITIONS = AMB TEMP/ RH TEST CONDITIONS = +100 DEG/ RH



WING 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 10 SEC. 100 DEG F. (PH-1011)

$Y = (1 + 3.6126063E+02) + (+3.5905709E-01) \times X$
 $F = +1.2334371E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +2.0600844E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +1.1106021E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 2785$ DEGREES OF FREEDOM = 2783
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +100 DEG/RH
 $S_t = +6.1027034E+01$
 $S_b = +3.2329947E-02$
 $S_e = +5.9728745E+01$

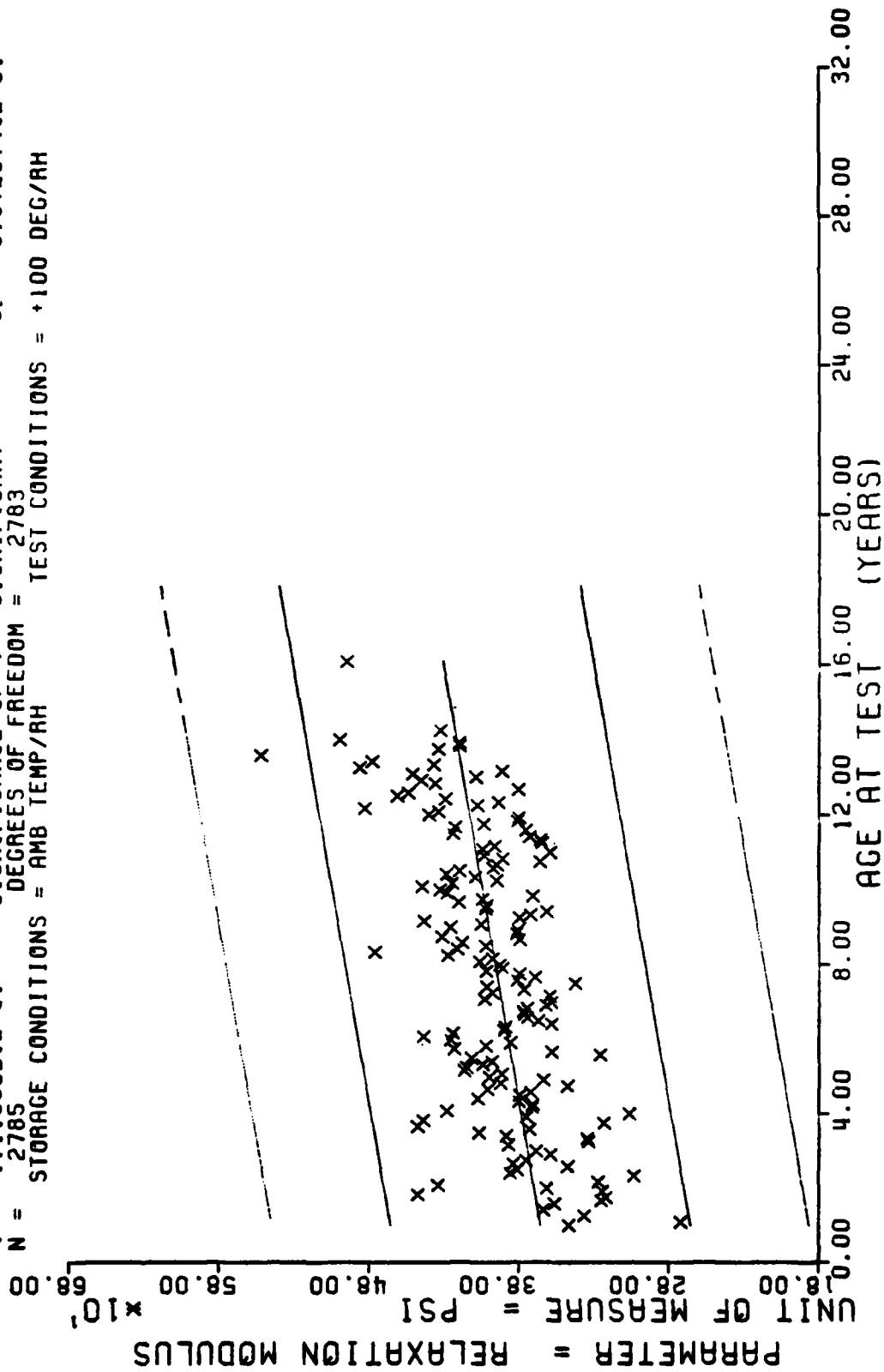
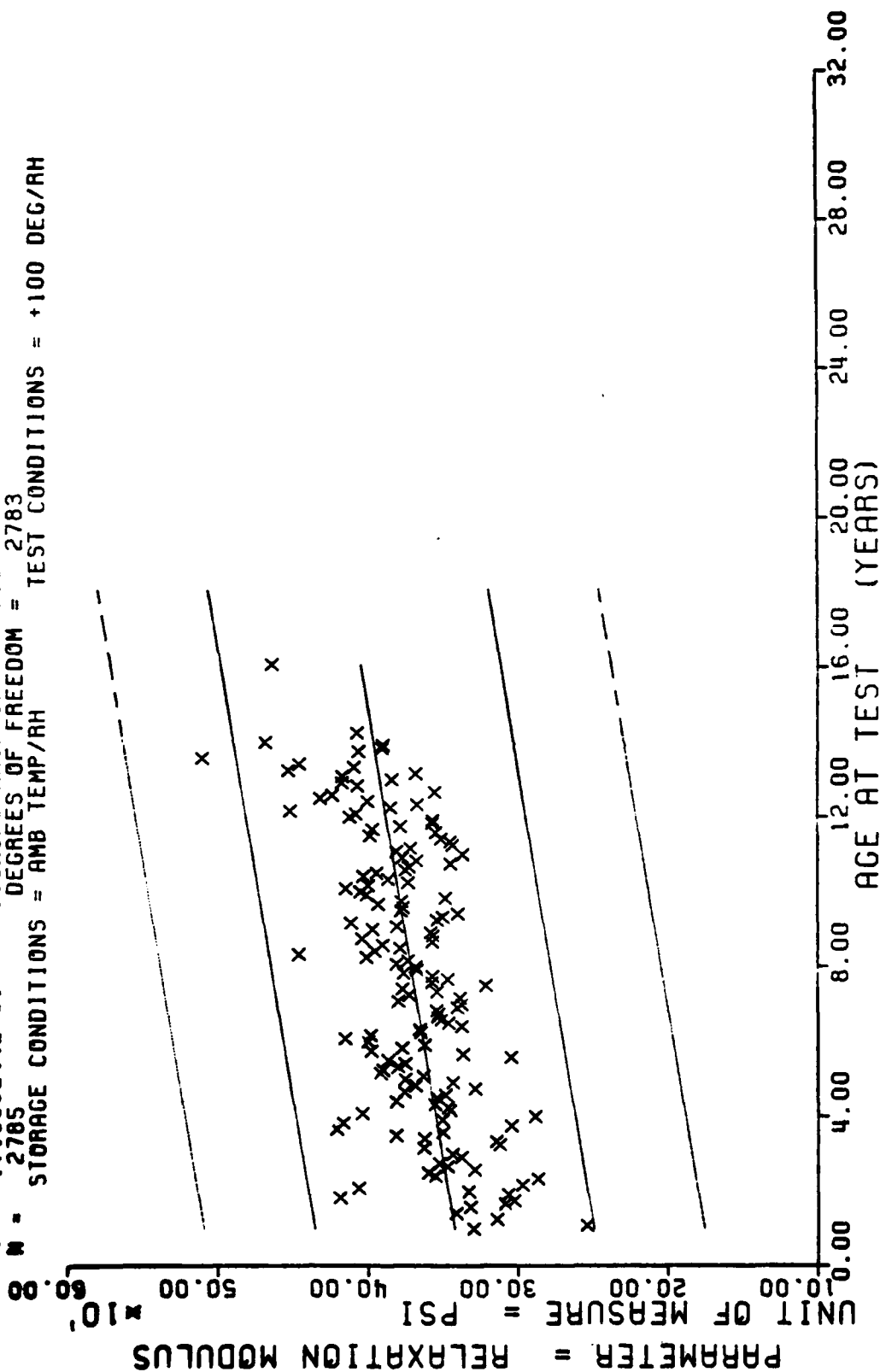


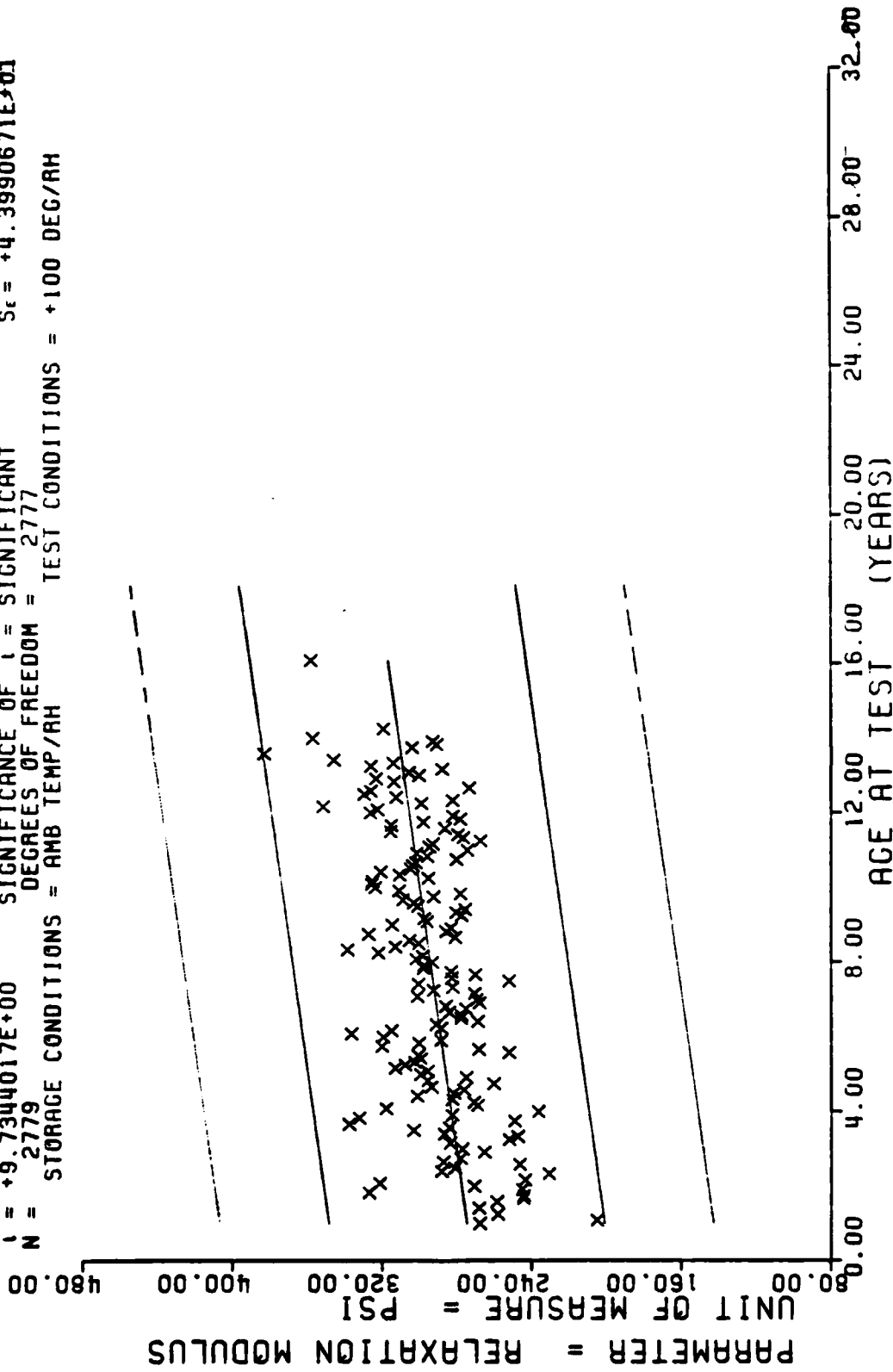
Figure 44

$Y = ((+3.3835487E+02) + (+3.4173720E-01) * X)$
 SIGNIFICANCE OF F = SIGNIFICANT
 SIGNIFICANCE OF R = SIGNIFICANT
 SIGNIFICANCE OF t = SIGNIFICANT
 DEGREES OF FREEDOM = 2783
 STORAGE CONDITIONS = AMB TEMP/RH
 TEST CONDITIONS = +100 DEG/RH



WING 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 100 SEC. 100 DEG F. TPH-1011

$Y = ((+2.7190205E+02) + (+2.3195070E-01) * X)$
 $F = +9.4758576E+01$ SIGNIFICANCE OF F = SIGNIFICANT $S_e = +4.4726862E+01$
 $R = +1.8164995E-01$ SIGNIFICANCE OF R = SIGNIFICANT $S_e = +2.3827936E-02$
 $t = +9.7344017E+00$ SIGNIFICANCE OF t = SIGNIFICANT $S_e = +4.3990671E+01$
 $N = 2779$ DEGREES OF FREEDOM = 2777
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +100 DEG/RH



WING 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 1000 SEC. 100 DEG F, TPH-1011

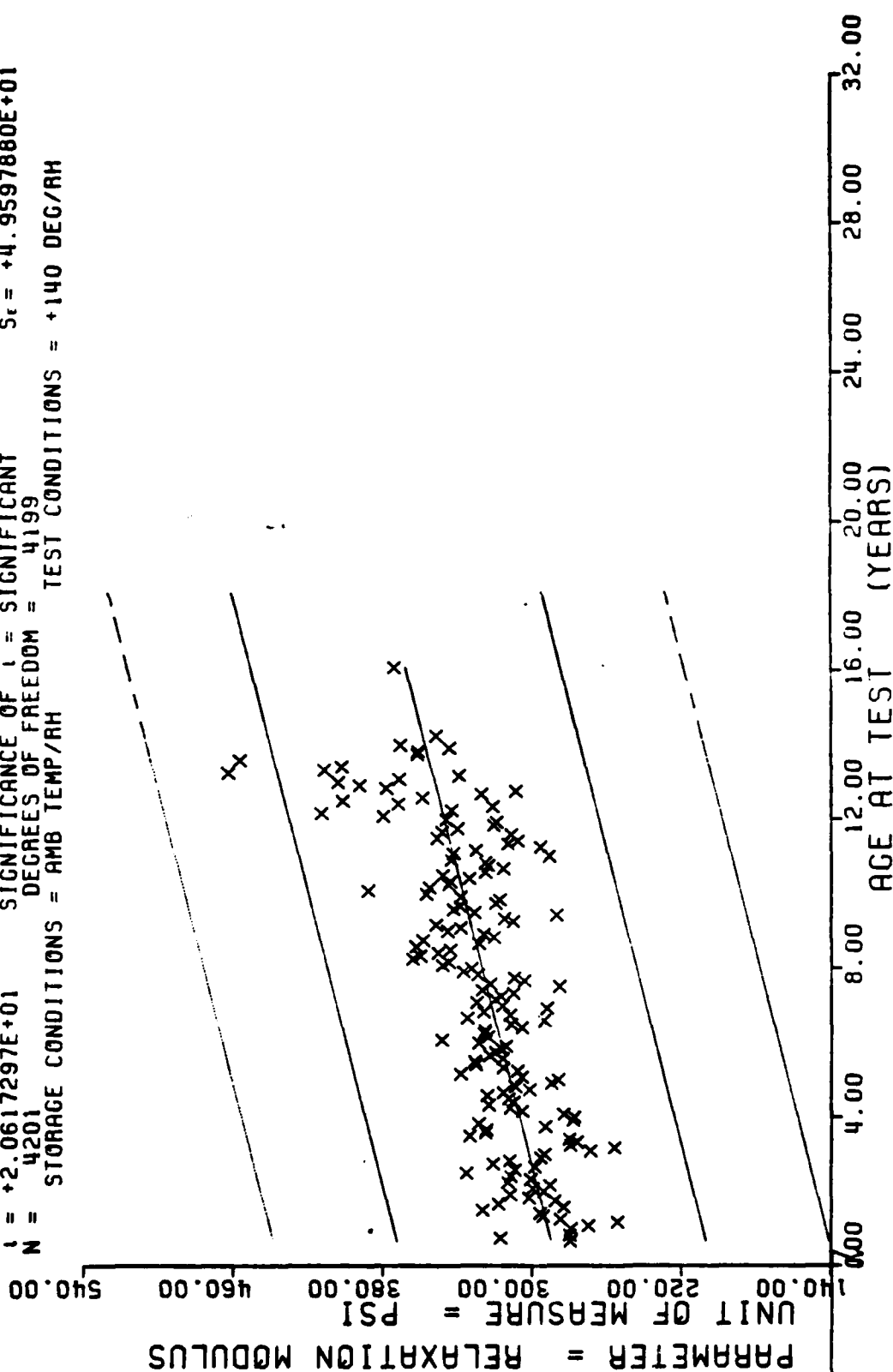
Figure 46

[illegible]

WING 6. STRESS RELAXATION MODULUS, 3.7% STRAIN, 100 SEC. 140 DEG F. TPH-1011

This sample size summary is applicable to figures 47 thru 50

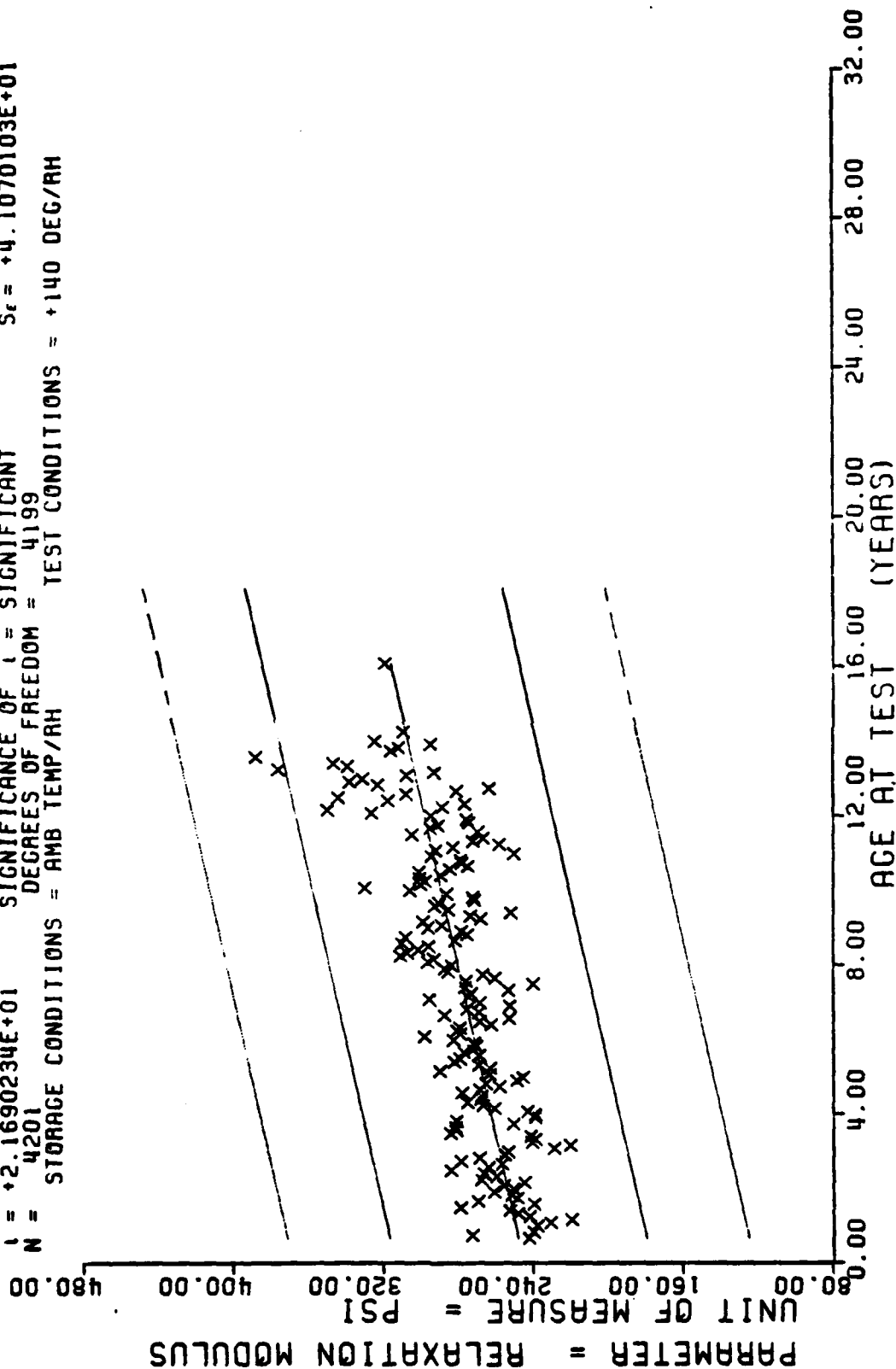
$Y = ((+2.8650507E+02) + (+4.1998383E-01) * X)$
 $F = +4.2507295E+02$ SIGNIFICANCE OF F = SIGNIFICANT $G_r = +5.2041620E+01$
 $R = +3.0319316E-01$ SIGNIFICANCE OF R = SIGNIFICANT $S_r = +2.0370459E-02$
 $I = +2.0617297E+01$ SIGNIFICANCE OF I = SIGNIFICANT $S_r = +4.9597880E+01$
 $N = 4201$ DEGREES OF FREEDOM = 4199
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +140 DEG/RH



WING 6. STRESS RELAXATION MODULUS. 3.0% STRAIN, 10 SEC. 140 DEG F. TPH-1011

Figure 47

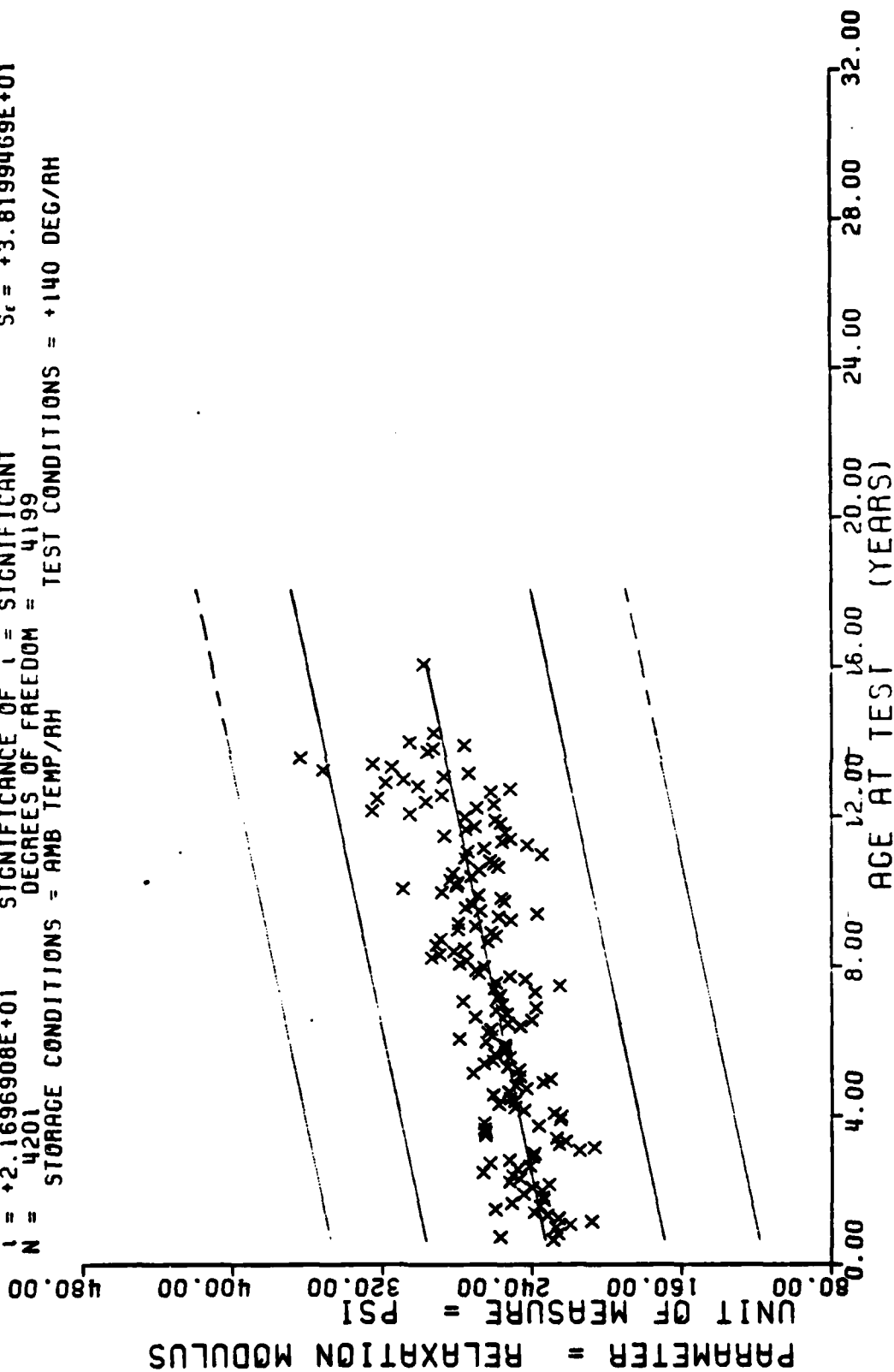
$Y = ((+2.4526065E+02) + (+3.6587081E-01) * X)$
 $F = +4.7046626E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +3.1741732E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +2.1690234E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 4201$ DEGREES OF FREEDOM = 4199
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +140 DEG/RH



WING 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 50 SEC. 140 DEG F. IIPH-1011

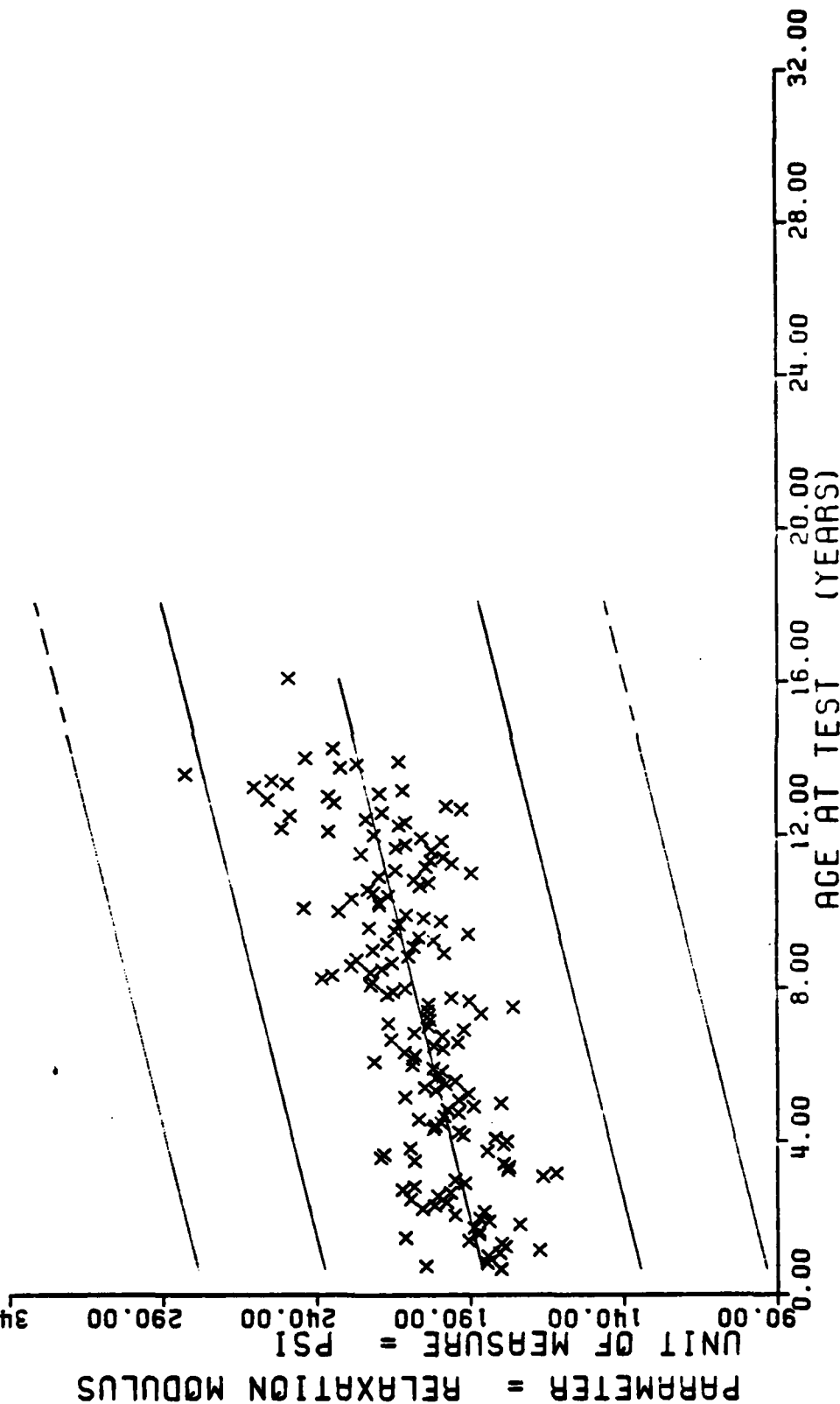
Figure 48

$F = +4.7075583E+02$
 $R = +3.1750514E-01$
 $I = +2.1696908E+01$
 $N = 4201$
 $Y = ((+2.3038279E+02) + (+3.4040263E-01) * X)$
 SIGNIFICANCE OF F = SIGNIFICANT
 SIGNIFICANCE OF R = SIGNIFICANT
 SIGNIFICANCE OF I = SIGNIFICANT
 DEGREES OF FREEDOM = 4199
 STORAGE CONDITIONS = AMB TEMP/RH
 TEST CONDITIONS = +140 DEG/RH



WING 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 100 SEC, 140 DEG F, IIPH-1011

$Y = ((+1.8401015E+02) + (+2.5182281E-01) * X)$
 $F = +3.9459657E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +2.9324911E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +1.9864455E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 4196$ DEGREES OF FREEDOM = 4194
 STORAGE CONDITIONS = AMB TEMP/AM TEST CONDITIONS = +140 DEG/AM



HING 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 1000 SEC. 140 DEG F. TPH-1011

Figure 50

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
8	3	34	51	59	42	84	24	109	9	134	24
9	9	35	33	60	63	85	9	110	9	135	12
10	6	36	57	61	69	86	21	111	6	136	6
12	24	37	21	62	73	87	27	112	36	137	18
13	24	38	18	63	66	88	30	113	48	138	60
14	12	39	48	64	51	89	30	114	41	139	50
15	24	40	18	65	36	90	39	115	21	140	6
16	18	41	21	66	45	91	27	116	33	141	15
17	33	42	18	67	30	92	18	117	21	142	26
18	18	43	9	68	51	93	24	118	20	143	36
19	9	44	6	69	78	94	23	119	15	144	12
20	6	45	6	70	80	95	24	120	29	146	6
21	18	46	6	71	45	96	63	121	12	147	6
22	9	47	30	72	60	97	57	122	9	148	6
23	9	48	42	73	38	98	63	123	12	149	12
24	30	49	42	74	36	99	39	124	21	150	6
25	35	50	36	75	36	100	20	125	15	151	12
26	24	51	57	76	39	101	19	126	24	152	3
27	24	52	68	77	27	102	9	127	14	154	6
28	26	53	27	78	42	103	21	128	15	155	6
29	50	54	33	79	18	104	6	129	6	156	9
30	42	55	33	80	24	105	12	130	30	157	6
31	33	56	42	81	36	106	3	131	48	158	6
32	54	57	54	82	27	107	6	132	12	160	3
33	30	58	57	83	18	108	27	133	12	161	18
										165	3
										166	6
										167	6
										168	3
										171	3
										193	3

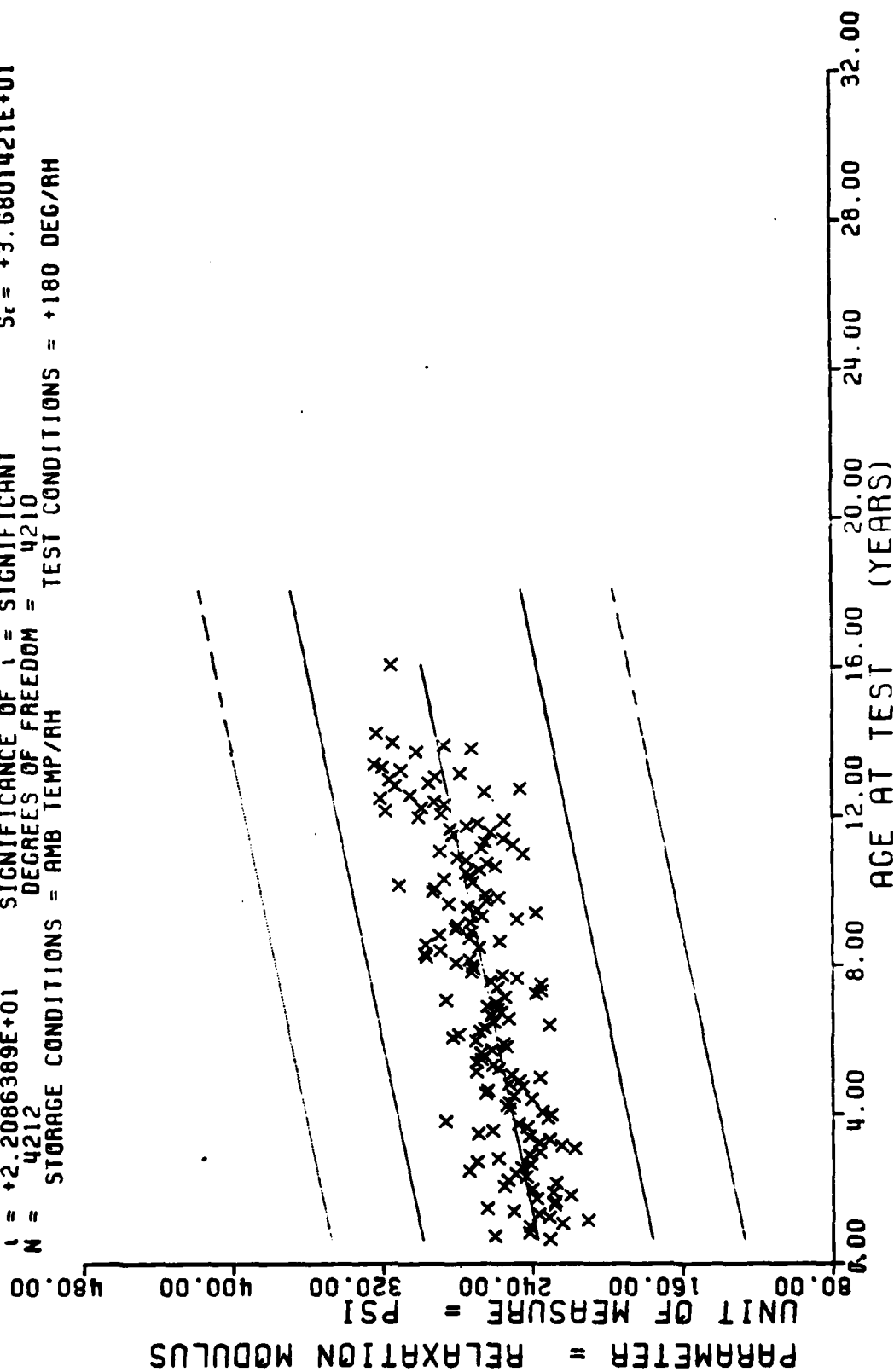
WING 6-STEPRESS RELAXATION MODULUS, 3.0% STRAIN, 1000 SEC, 180 DEG F, 1711

This sample size summary is applicable to all samples of this type.

FIG. 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 1000 SEC. 18° NEG =, TPH-1711

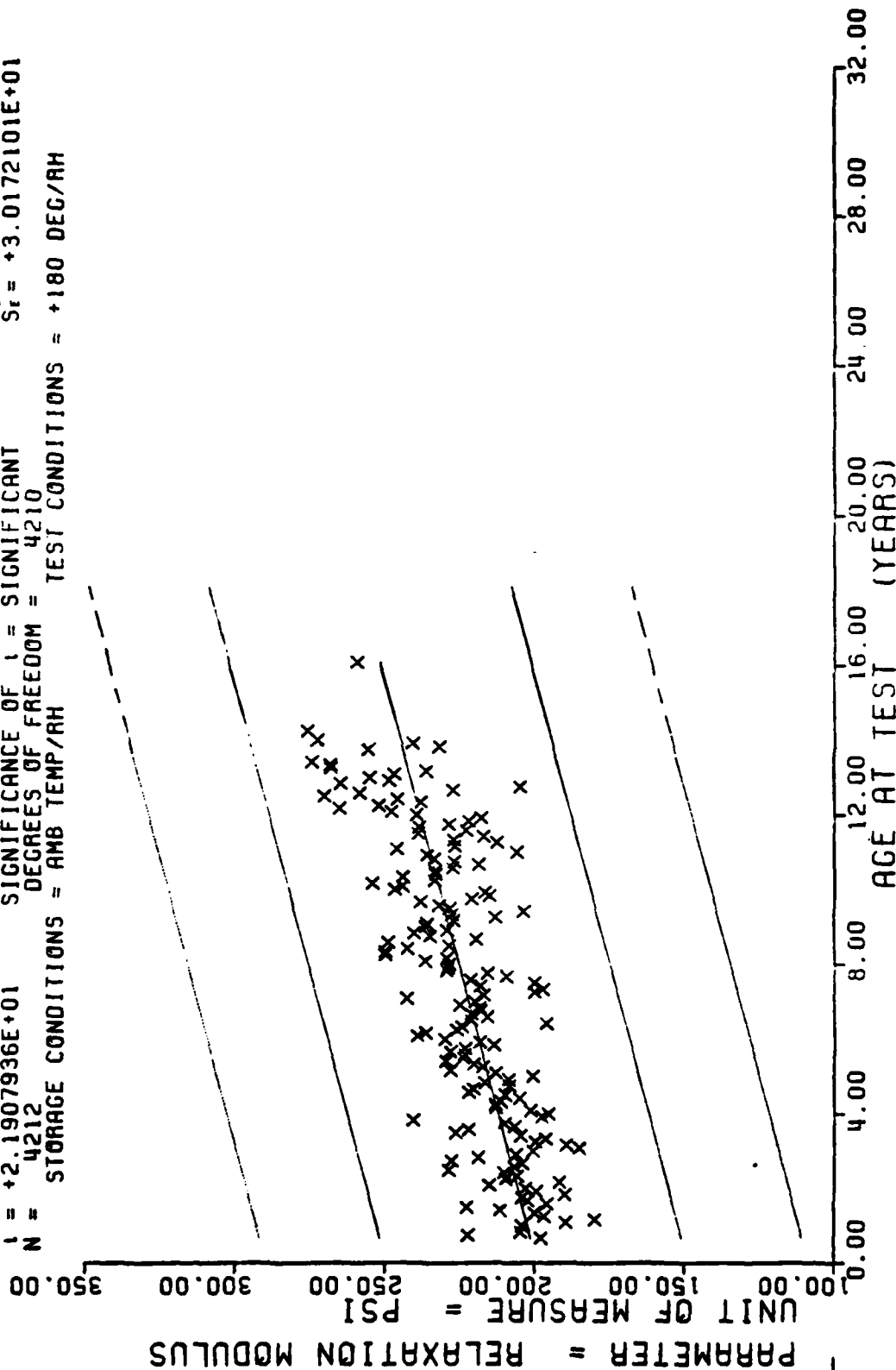
This sample size summary is applicable to figures 51 thru 54

$Y = ((+2.3482130E+02) + (+3.3416923E-01) * X)$
 $F = +4.8780859E+02$ SIGNIFICANCE OF F = SIGNIFICANT $\sigma_r = +3.8870455E+01$
 $A = +3.2223823E-01$ SIGNIFICANCE OF A = SIGNIFICANT $S_o = +1.5130098E-02$
 $I = +2.2086389E+01$ SIGNIFICANCE OF I = SIGNIFICANT $S_r = +3.6801421E+01$
 $N = 4212$ DEGREES OF FREEDOM = 4210
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +180 DEG/RH



WING 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 10 SEC. 180 DEG F. IIPH-1011

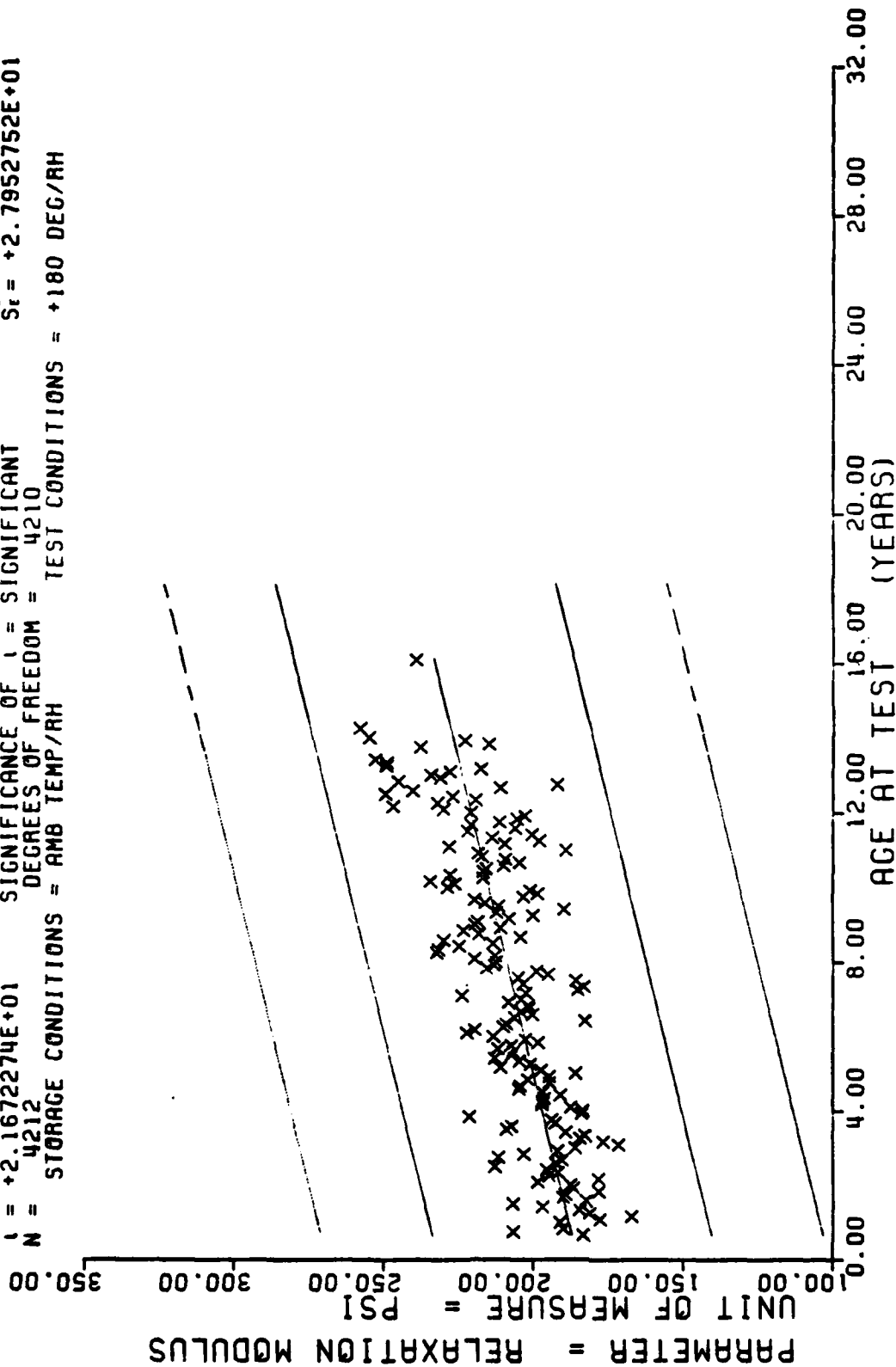
$Y = ((+1.9898944E+02) + (+2.7175915E-01) * X)$
 $F = +4.7995766E+02$ SIGNIFICANCE OF F = SIGNIFICANT $G_f = +3.1841784E+01$
 $R = +3.1990203E-01$ SIGNIFICANCE OF R = SIGNIFICANT $S_p = +1.2404598E-02$
 $I = +2.1907936E+01$ SIGNIFICANCE OF I = SIGNIFICANT $S_t = +3.0172101E+01$
 $N = 4212$ DEGREES OF FREEDOM = 4210
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +180 DEG/RH



WING 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 50 SEC. 180 DEG F, IPH-1011

Figure 52

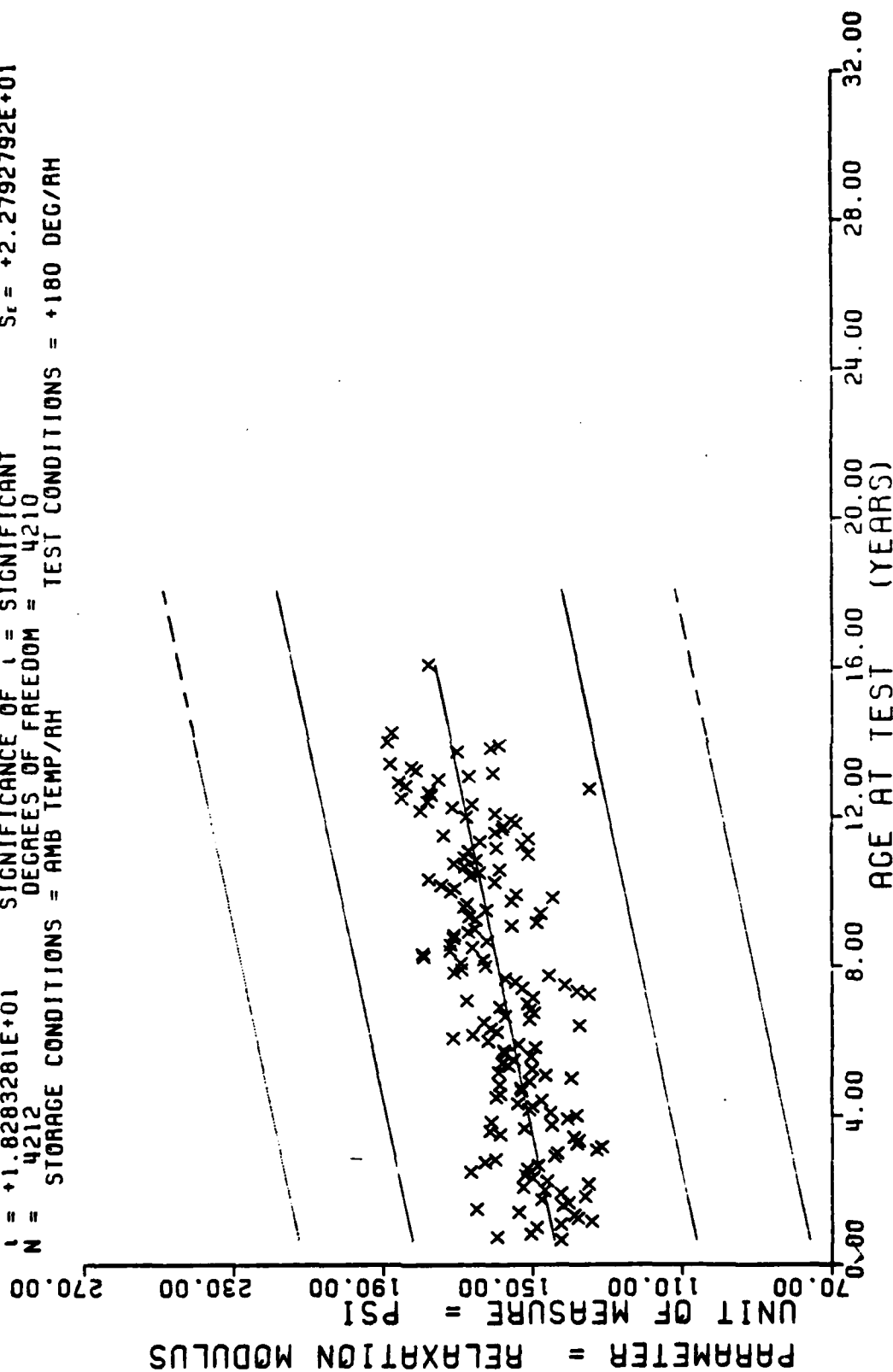
$F = +4.6968749E+02$ SIGNIFICANCE OF F = SIGNIFICANT $G_r = +2.9467302E+01$
 $R = +3.1680795E-01$ SIGNIFICANCE OF R = SIGNIFICANT $S_o = +1.1492161E-02$
 $I = +2.1672274E+01$ SIGNIFICANCE OF I = SIGNIFICANT $S_t = +2.7952752E+01$
 $N = 4212$ DEGREES OF FREEDOM = 4210
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +180 DEG/RH



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 100 SEC, 180 DEG F, TPH-101

Figure 53

$Y = ((+1.4289209E+02) + (+1.7132819E-01) * X)$
 $F = +3.3427839E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +2.7121998E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $I = +1.8283281E+01$ SIGNIFICANCE OF I = SIGNIFICANT
 $N = 4212$ DEGREES OF FREEDOM = 4210
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +180 DEG/RH



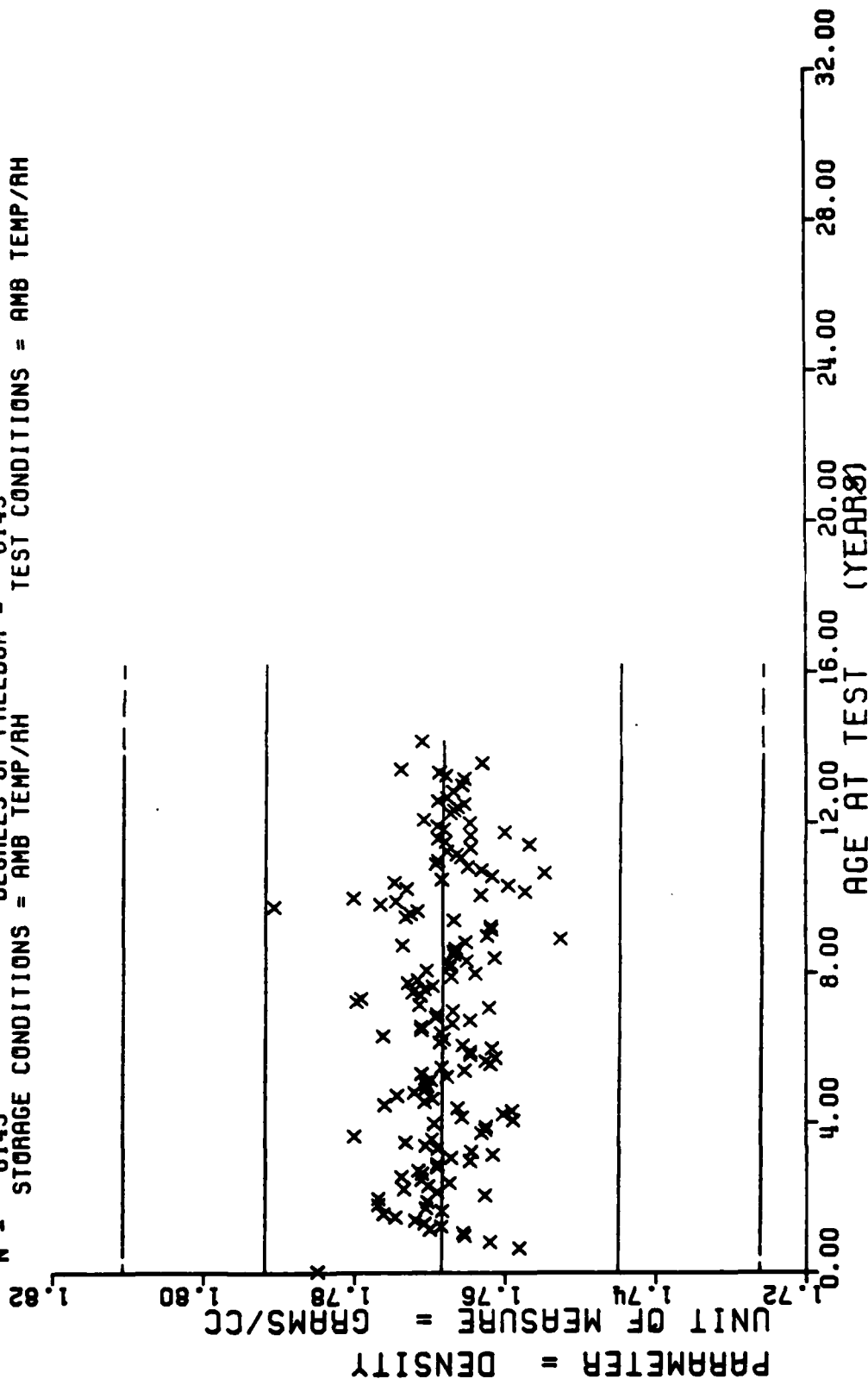
WING 6. STRESS RELAXATION MODULUS, 3.0% STRAIN, 1000 SEC. 180 DEG F. TPH-1011

AGE (MOS)	NR SAMP	AGF (MOS)	NP SAMP	AGF (MOS)	NR SAMP	AGF (MOS)	NP SAMP	AGF (MOS)	NR SAMP
1	3	34	48	59	44	84	16	110	24
8	4	35	64	60	73	85	13	111	60
10	24	36	47	61	64	86	16	112	20
12	12	37	56	62	74	87	16	113	20
13	32	38	47	63	74	88	28	114	76
14	36	39	36	64	80	89	44	115	76
15	20	40	45	65	90	90	44	116	71
16	20	41	36	66	39	91	48	117	32
17	28	42	26	67	52	92	32	118	120
18	32	43	20	68	64	93	23	119	98
19	52	44	4	69	67	94	32	120	104
20	12	45	12	70	56	95	39	121	76
21	32	46	19	71	84	96	36	122	60
22	28	47	36	72	100	97	44	123	8
23	24	48	36	73	60	98	36	124	12
24	8	49	44	74	107	99	80	126	7
25	40	50	24	75	64	100	80	127	28
26	56	51	60	76	40	101	56	128	20
27	32	52	103	77	44	102	32	129	48
28	44	53	112	78	54	103	36	130	24
29	43	54	38	79	38	104	12	131	74
30	44	55	42	80	50	105	4	132	128
31	72	56	70	81	40	106	28	133	79
32	64	57	43	82	20	107	16	134	52
33	52	58	86	83	40	108	12	135	48

STAGE 1, WING 6, TP-H1011, SOL GFL, DENSITY

This sample size summary is applicable to figures 55 thru 57

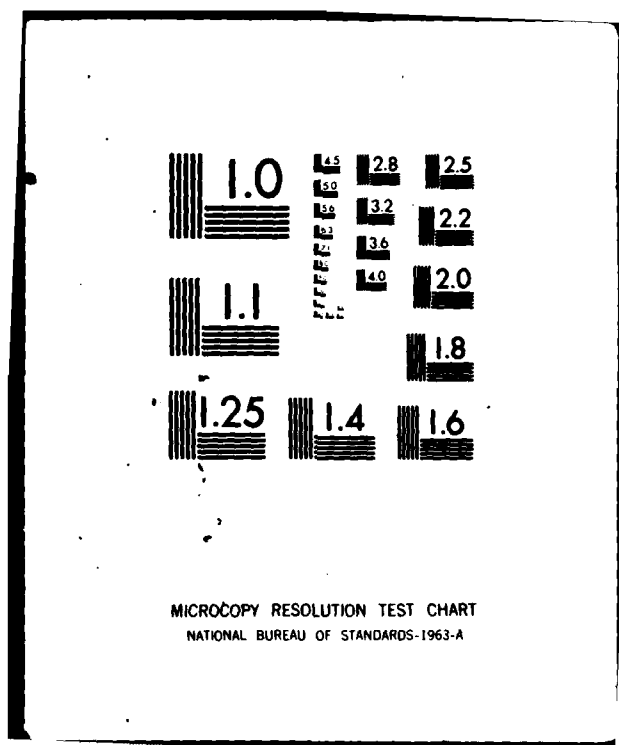
$Y = ((+1.7684740E+00) + (-3.3323555E-06) \times X)$
 $F = +4.8465683E-01$ SIGNIFICANCE OF F = NOT SIGNIFICANT $\sigma_f = +1.4089208E-02$
 $R = -8.8819797E-03$ SIGNIFICANCE OF R = NOT SIGNIFICANT $S_e = +4.7866774E-06$
 $t = +6.9617299E-01$ SIGNIFICANCE OF t = NOT SIGNIFICANT $S_e = +1.4089799E-02$
 $N = 6145$ DEGREES OF FREEDOM = 6143
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH



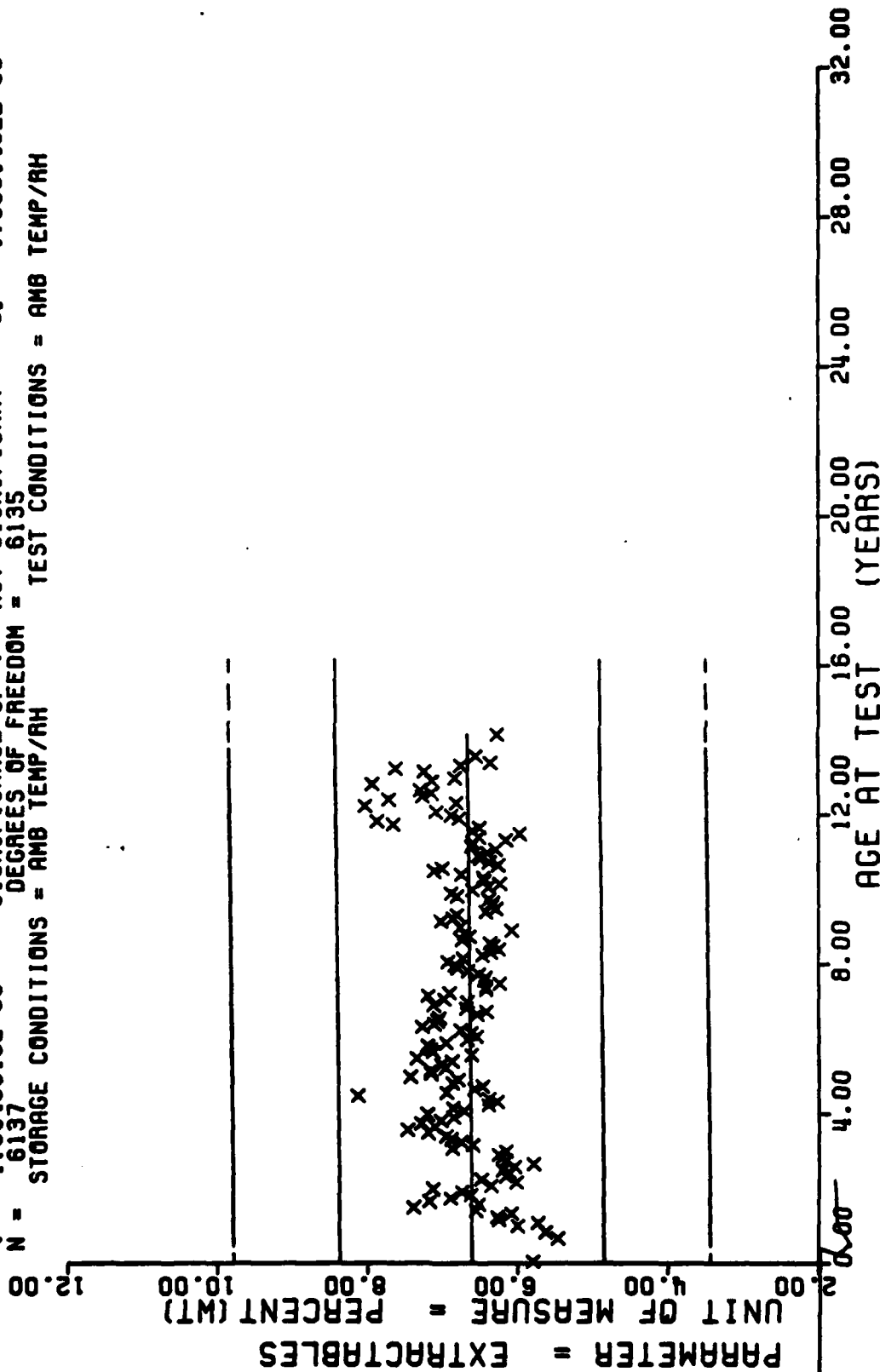
STAGE 1, WING 6, TP-H1011, SOL GEL, DENSITY

AD-A091 765 OGDEN AIR LOGISTICS CENTER HILL AFB UT PROPELLANT AN--ETC F/G 21/9.2
PROPELLANT SURVEILLANCE REPORT, LGM-30 F & G STAGE I, PHASE G, --ETC(U)
OCT 80 J A THOMPSON
UNCLASSIFIED MAKPH-445(80) NL

END
DATE
FILMED
5-1-81
DTIC



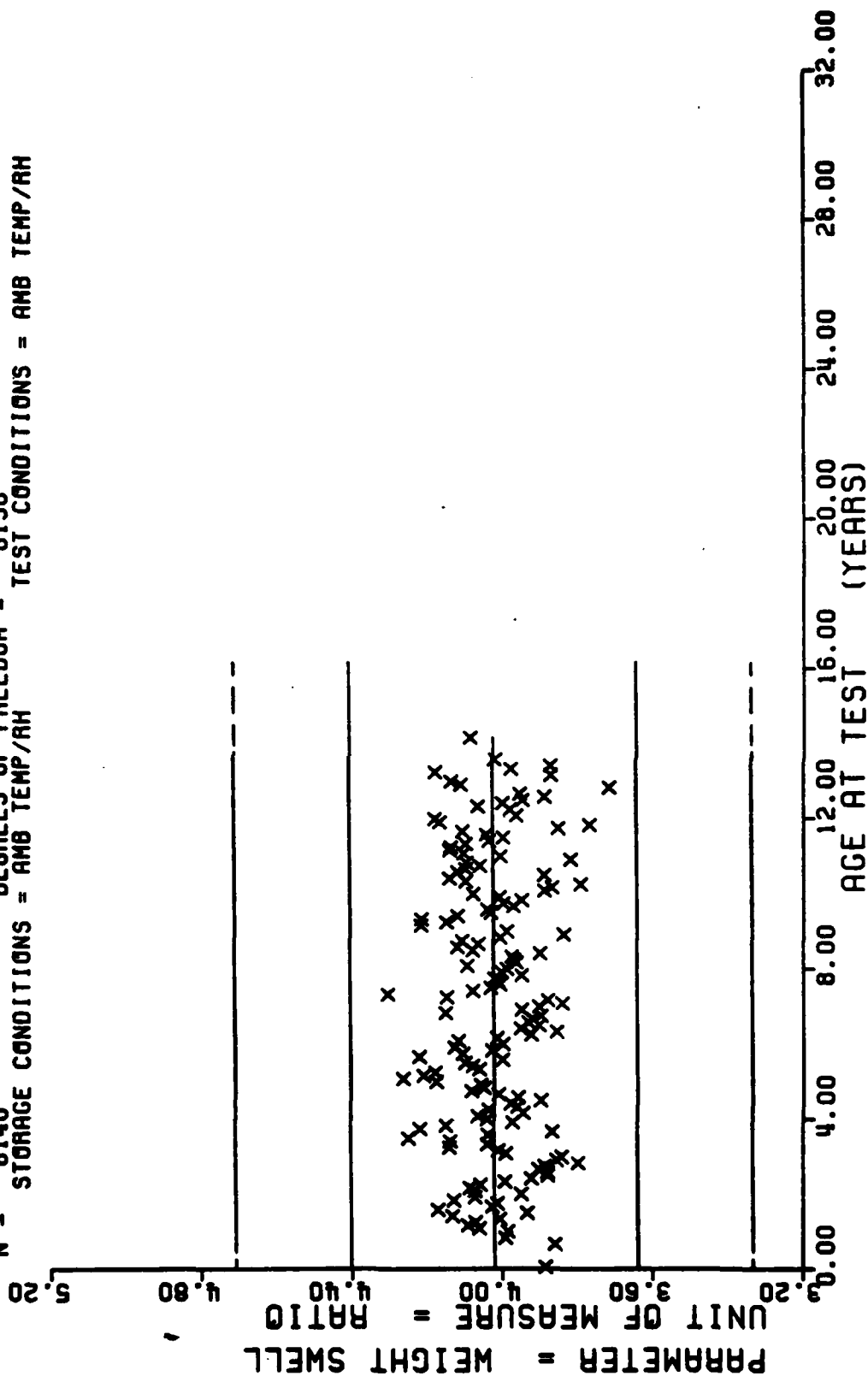
$Y = ((+6.6139134E+00) + (+3.7957260E-04) \times X)$
 $F = +1.1120997E+00$ SIGNIFICANCE OF F = NOT SIGNIFICANT $\sigma_1 = +1.0591499E+00$
 $R = +1.3462484E-02$ SIGNIFICANCE OF R = NOT SIGNIFICANT $S_0 = +3.5993410E-04$
 $t = +1.0545613E+00$ SIGNIFICANCE OF t = NOT SIGNIFICANT $S_t = +1.0591402E+00$
 $N = 6137$ DEGREES OF FREEDOM = 6135
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



STAGE 1, WING 6 TP-H1011, SOL GEL, PERCENT EXTRACTABLES

Figure 56

$Y = ((+4.0203306E+00) + (+4.9911033E-05) \times X)$
 $F = +4.0987041E-01$ SIGNIFICANCE OF F = NOT SIGNIFICANT $\sigma^2 = +2.2942603E-01$
 $R = +8.1713787E-03$ SIGNIFICANCE OF R = NOT SIGNIFICANT $S_e = +7.7960280E-05$
 $t = +6.4021122E-01$ SIGNIFICANCE OF t = NOT SIGNIFICANT $S_e = +2.2943706E-01$
 $N = 6140$ DEGREES OF FREEDOM = 6138
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



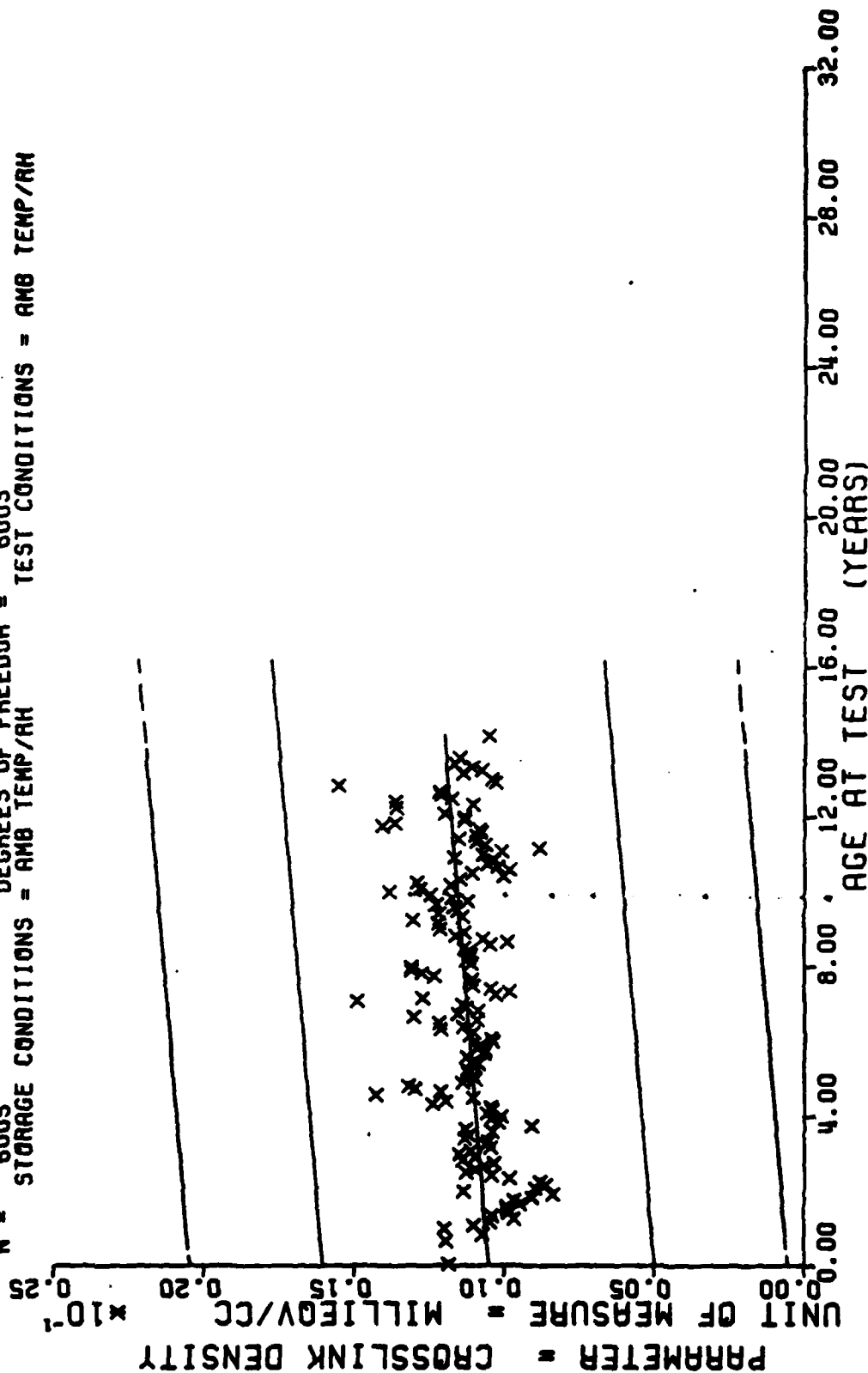
STAGE 1, WING 6, TP-H1011, SOL GEL, GEL SWELL RATIO

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
1	3	34	48	59	44	84	16	110	24
8	4	35	64	60	73	85	13	111	60
10	24	36	47	61	64	86	16	112	20
12	12	37	56	62	74	87	16	113	20
13	32	38	47	63	74	88	28	114	76
14	36	39	36	64	79	89	44	115	76
15	20	40	45	65	90	90	44	116	71
16	20	41	36	66	39	91	48	117	32
17	28	42	26	67	52	92	32	118	120
18	32	43	20	68	64	93	23	119	98
19	52	44	4	69	67	94	32	120	104
20	12	45	12	70	56	95	39	121	76
21	32	46	19	71	84	96	36	122	60
22	28	47	36	72	100	97	43	123	8
23	24	48	36	73	60	98	36	124	12
24	8	49	44	74	107	99	80	126	7
25	40	50	24	75	64	100	80	127	28
26	56	51	60	76	40	101	56	128	20
27	32	52	103	77	44	102	32	129	48
28	44	53	112	78	54	103	36	130	24
29	43	54	14	79	38	104	12	131	74
30	44	55	42	80	50	105	4	132	128
31	72	56	70	81	40	106	28	133	79
32	64	57	43	82	20	107	16	134	40
33	52	58	86	83	39	108	12	135	28

STAGE 1, WING 6, TP-H1011, SOL GEL, CROSSLINK DENSITY

This sample size summary is applicable to figure 58

$Y = ((+1.0512792E-02) + (+8.7654937E-06) \times X)$
 $F = +5.7543930E+01$ SIGNIFICANCE OF F = SIGNIFICANT $\sigma_r = +3.3383067E-03$
 $R = +9.7441499E-02$ SIGNIFICANCE OF R = SIGNIFICANT $S_e = +1.1555177E-06$
 $t = +7.5857715E+00$ SIGNIFICANCE OF t = SIGNIFICANT $S_t = +3.3226973E-03$
 $N = 6005$ DEGREES OF FREEDOM = 6003
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



STAGE 1. WING 6, TP-H1011, SOL GEL, CROSSLINK DENSITY

Figure 58

*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
2	3	27	29	53	72	78	75	103	12	129	9	129	9	129	9	129	9	129	9	129	9
3	15	28	34	54	42	79	27	104	12	130	60	130	60	130	60	130	60	130	60	130	60
4	10	29	59	55	34	80	54	105	3	131	96	131	96	131	96	131	96	131	96	131	96
5	11	30	31	56	74	81	51	106	3	132	18	132	18	132	18	132	18	132	18	132	18
6	23	31	51	57	84	82	32	107	15	133	21	133	21	133	21	133	21	133	21	133	21
7	18	32	67	58	60	83	38	108	6	134	36	134	36	134	36	134	36	134	36	134	36
8	24	33	56	59	40	84	25	109	36	135	18	135	18	135	18	135	18	135	18	135	18
9	24	34	61	60	53	85	33	110	33	136	12	136	12	136	12	136	12	136	12	136	12
10	40	35	39	61	72	86	27	111	18	137	27	137	27	137	27	137	27	137	27	137	27
11	24	36	32	62	99	87	39	112	22	138	87	138	87	138	87	138	87	138	87	138	87
12	40	37	43	63	94	88	32	113	107	139	60	139	60	139	60	139	60	139	60	139	60
13	51	38	29	64	92	89	55	114	47	140	23	140	23	140	23	140	23	140	23	140	23
14	52	39	48	65	37	90	57	115	57	141	15	141	15	141	15	141	15	141	15	141	15
15	52	40	36	66	37	91	39	116	45	142	24	142	24	142	24	142	24	142	24	142	24
16	63	41	12	67	62	92	32	117	107	143	66	143	66	143	66	143	66	143	66	143	66
17	15	42	24	68	82	93	19	118	37	144	3	144	3	144	3	144	3	144	3	144	3
18	65	43	24	69	65	94	37	119	63	145	9	145	9	145	9	145	9	145	9	145	9
19	28	44	16	70	83	95	42	120	81	146	15	146	15	146	15	146	15	146	15	146	15
20	28	46	31	71	40	96	50	121	48	147	3	147	3	147	3	147	3	147	3	147	3
21	17	47	30	72	27	97	95	122	12	148	6	148	6	148	6	148	6	148	6	148	6
22	22	48	37	73	78	98	70	123	3	149	14	149	14	149	14	149	14	149	14	149	14
23	11	49	64	74	60	99	44	124	3	150	3	150	3	150	3	150	3	150	3	150	3
24	19	50	17	75	63	100	39	125	9	151	6	151	6	151	6	151	6	151	6	151	6
25	64	51	60	76	55	101	24	126	3	153	3	153	3	153	3	153	3	153	3	153	3
26	22	52	90	77	43	102	14	128	12	154	6	154	6	154	6	154	6	154	6	154	6

STAGE 1

WING 6

TP-H 1011

CONSTANT STRAIN

This sample size summary is applicable to figure 59

$Y = ((+2.5953240E+01) + (-1.7918979E-02) \times X)$
 $F = +3.8489694E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = -2.4930173E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +1.9618790E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 5810$ DEGREES OF FREEDOM = 5808
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH

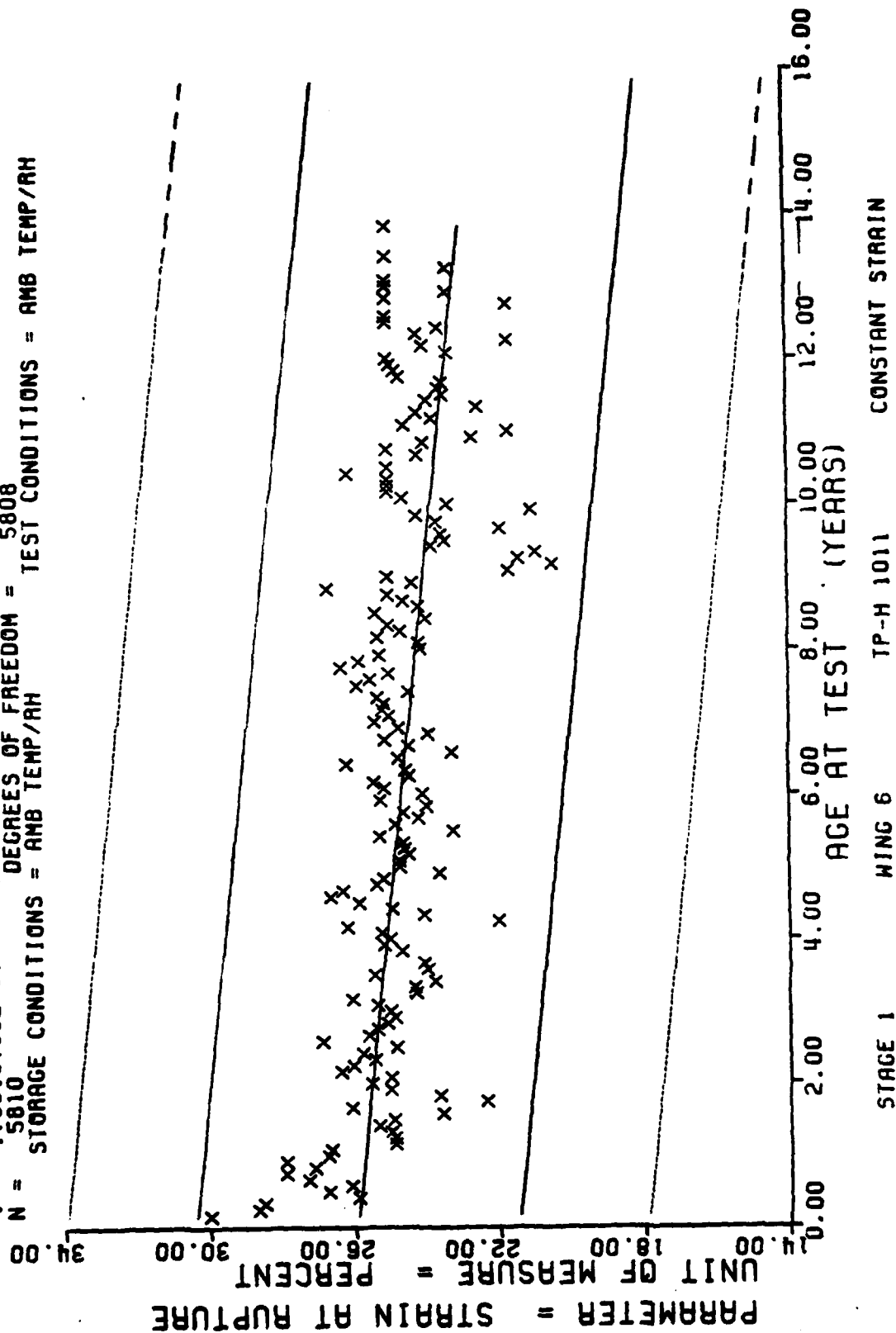


Figure 59

[illegible]

STAGE 1 WING 6 TP-H 1011 SHORE A, 10 SECOND HARDNESS

This sample size summary is applicable to figure 60

$Y = ((+6.4353342E+01) + (+1.5798928E-02) \times X)$
 $F = +4.0072962E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +2.9922219E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +2.0018232E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 4077$ DEGREES OF FREEDOM = 4075
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH

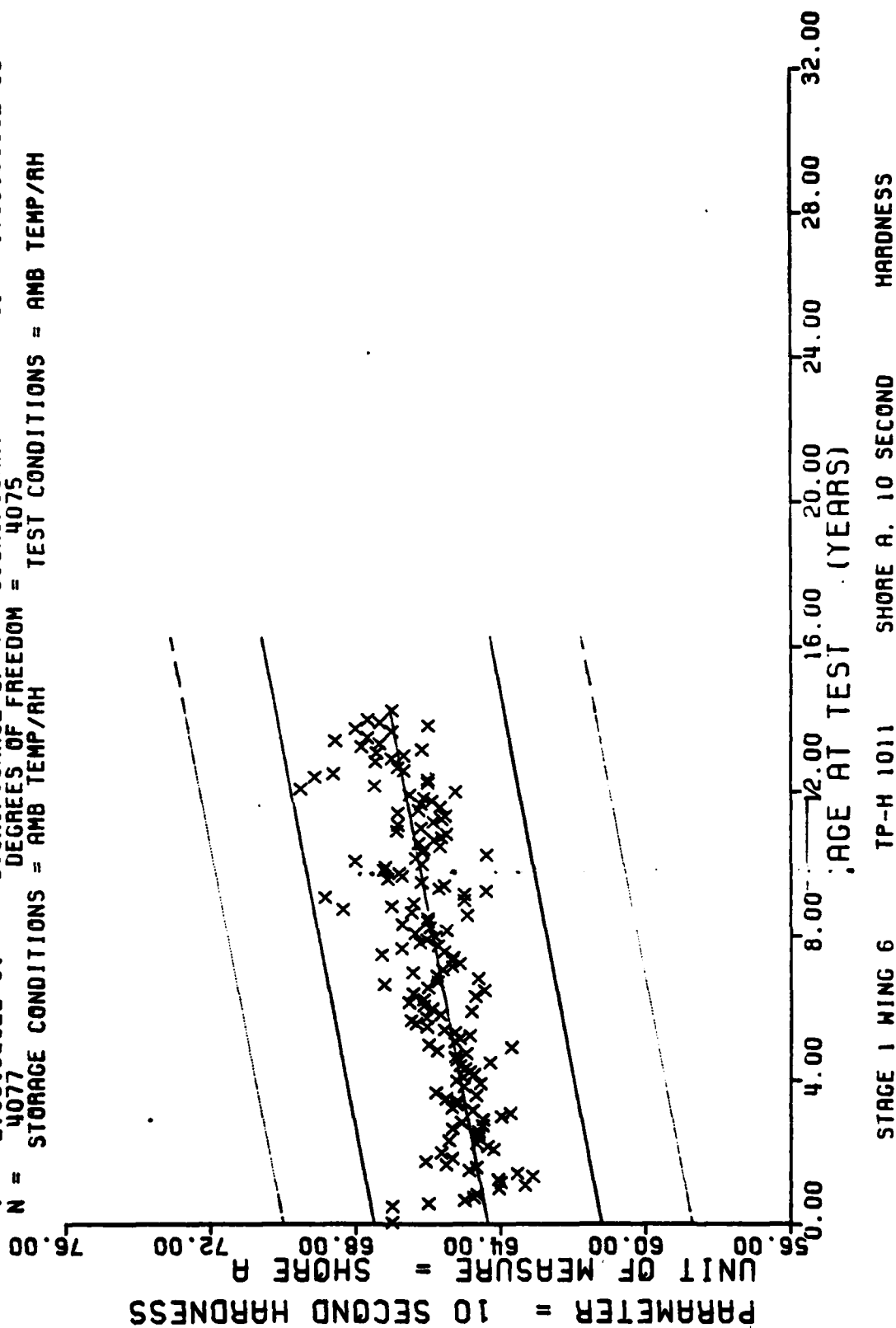


Figure 60

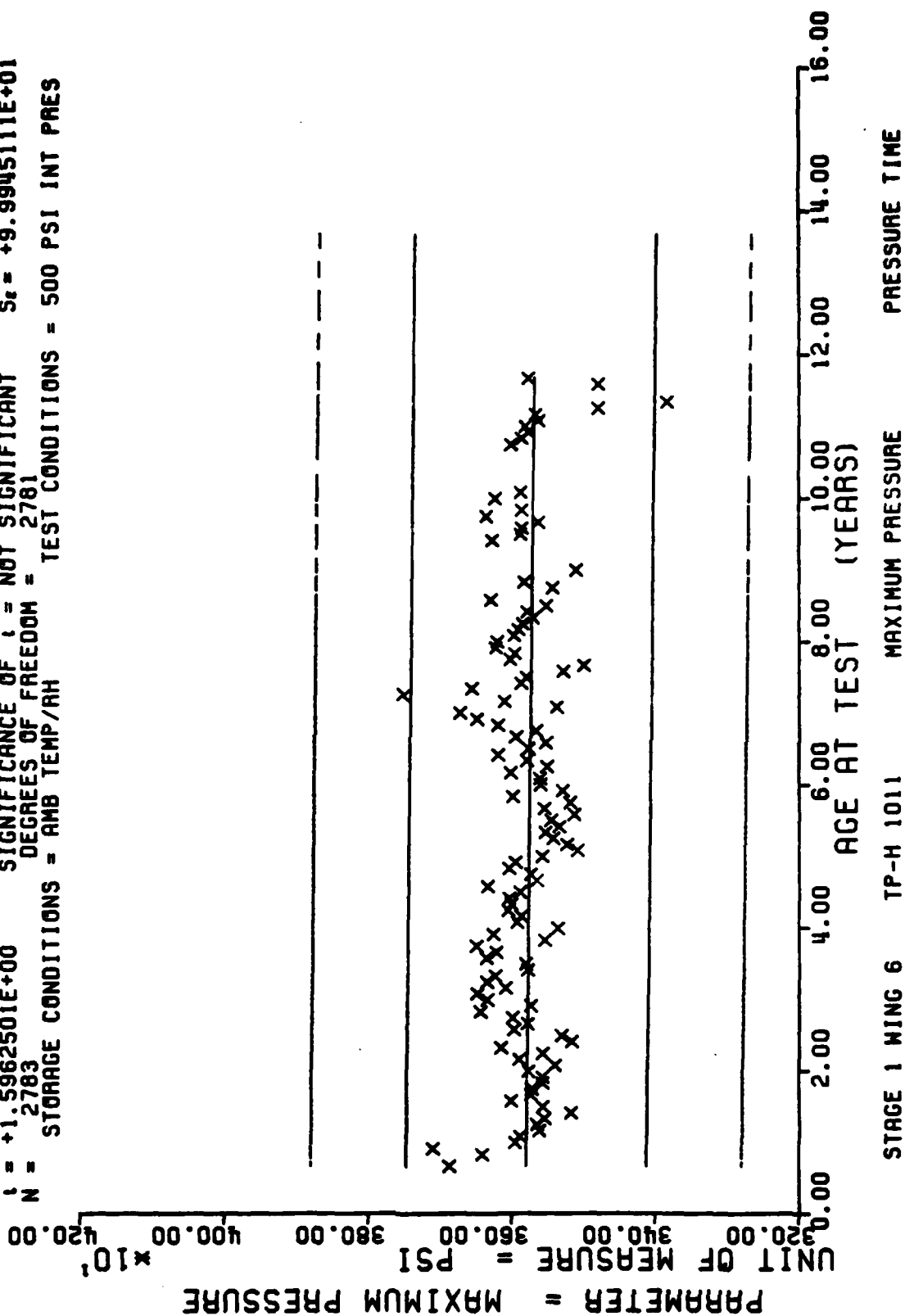
*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
8	3	34	39	59	57	84	5	115	56
17	15	35	50	60	43	85	3	116	55
11	1	36	39	61	34	86	3	117	7
12	6	37	13	62	79	87	3	118	10
13	15	38	11	63	46	88	12	120	39
14	13	39	16	64	80	89	24	121	12
15	16	40	11	65	72	90	36	129	3
16	17	41	13	66	38	91	24	130	36
17	18	42	30	67	59	92	5	131	33
18	19	43	4	68	38	93	17	132	5
19	22	44	10	69	40	94	15	133	6
20	35	45	7	70	46	95	15	134	18
21	16	46	12	71	11	96	18	135	25
22	19	47	16	72	12	97	38	136	3
23	21	48	4	73	8	98	40	139	12
24	19	49	36	74	4	99	26	140	12
25	25	50	13	75	36	100	23		
26	27	51	38	76	26	101	21		
27	36	52	39	77	22	102	8		
28	38	53	47	78	13	103	6		
29	43	54	37	79	7	105	9		
30	24	55	25	80	21	106	6		
31	51	56	21	81	24	108	3		
32	42	57	25	82	7	113	3		
33	54	58	22	83	9	114	11		

STAGE 1 WING 6 TP-H 1011 TIME TO MAXIMUM PRESSURE PRESSURE TIME

This sample size summary is applicable to figures 61 and 62

$Y = ((+3.5805614E+03) + (-9.4303953E-02) * X)$
 $F = +2.5480146E+00$ SIGNIFICANCE OF F = NOT SIGNIFICANT $\sigma_r = +9.9972914E+01$
 $R = -3.0255309E-02$ SIGNIFICANCE OF R = NOT SIGNIFICANT $S_e = +5.9078429E-02$
 $t = +1.5962501E+00$ SIGNIFICANCE OF t = NOT SIGNIFICANT $S_e = +9.9945111E+01$
 $N = 2783$ DEGREES OF FREEDOM = 2781
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 500 PSI INT PRES



$Y = ((+6.9429935E-01) + (-1.4509495E-04) \times X)$
 $F = +9.5138183E+00$ SIGNIFICANCE OF F = SIGNIFICANT $\sigma_1 = +7.9702330E-02$
 $R = -5.8389578E-02$ SIGNIFICANCE OF R = SIGNIFICANT $S_0 = +4.7040819E-05$
 $t = +3.0844478E+00$ SIGNIFICANCE OF t = SIGNIFICANT $S_1 = +7.9580652E-02$
 $N = 2783$ DEGREES OF FREEDOM = 2781
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = 500 PSI INT PRES

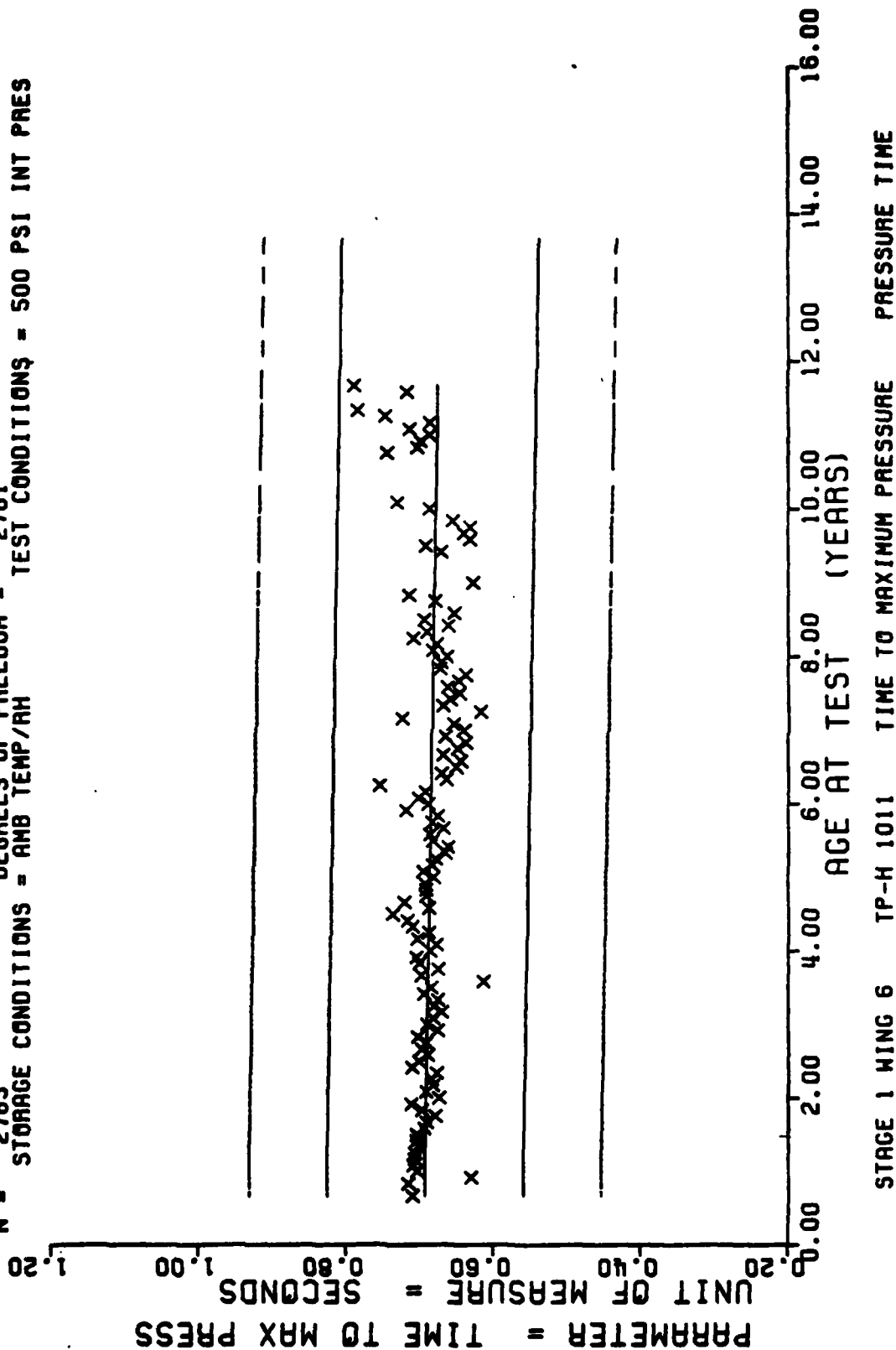


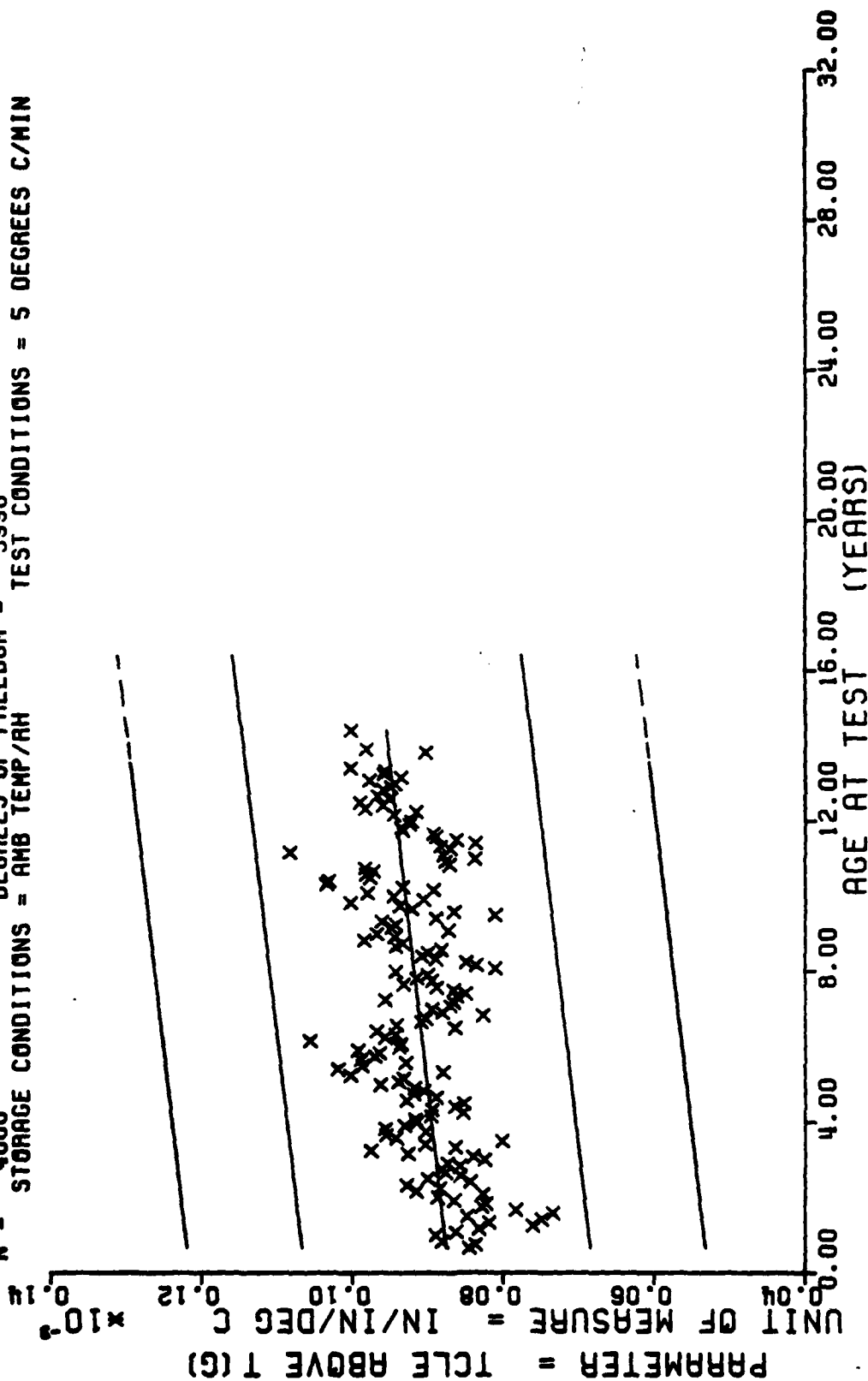
Figure 62

[illegible]

1. WING STAGE 1, WING 6, TP-H1011, THERMAL COEFFICIENT OF LINEAR EXPANSION ABOVE TG

This sample size summary is applicable to figures 63 and 64

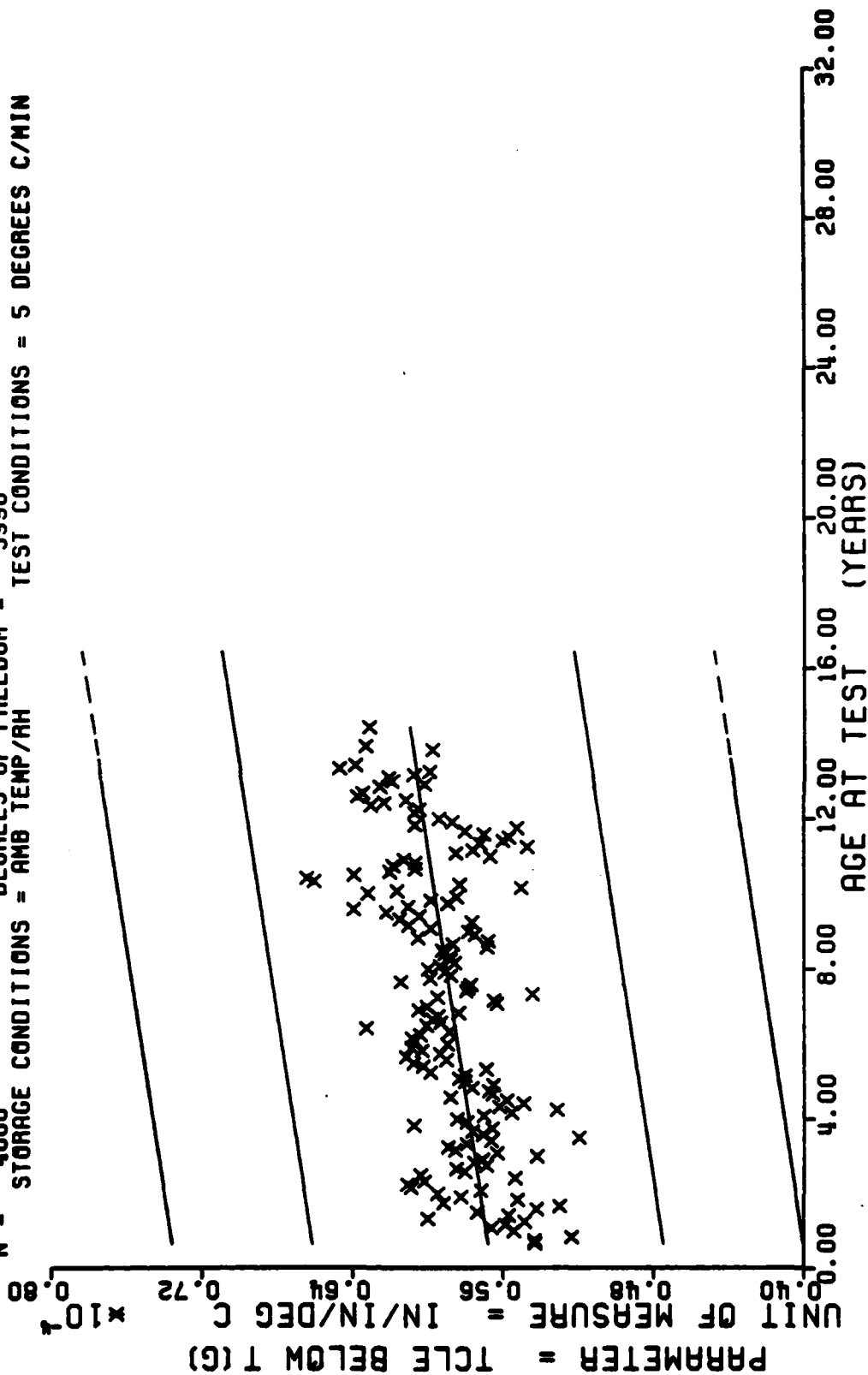
$Y = ((+8.7212845E-05) + (+4.8334439E-08) \times X)$
 $F = +1.0009176E+02$ SIGNIFICANCE OF F = SIGNIFICANT $\sigma_r = +1.1602455E-05$
 $R = +1.5628177E-01$ SIGNIFICANCE OF R = SIGNIFICANT $S_e = +4.8312278E-09$
 $t = +1.0004587E+01$ SIGNIFICANCE OF t = SIGNIFICANT $S_t = +1.1461323E-05$
 $N = 4000$ DEGREES OF FREEDOM = 3998
 STORAGE CONDITIONS = AMB TEMP/AM TEST CONDITIONS = 5 DEGREES C/MIN



STAGE 1, WING 6, TP-H1011, THERMAL COEFFICIENT OF LINEAR EXPANSION ABOVE TG

Figure 63

$Y = ((+5.6604095E-05) + (+2.5143969E-08) \times X)$
 $F = +1.1377751E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +1.6634640E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +1.0666654E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 4000$ DEGREES OF FREEDOM = 3998
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = 5 DEGREES C/MIN



STAGE 1, WING 6, TP-H1011 THERMAL COEFFICIENT OF LINEAR EXPANSION BELOW TG

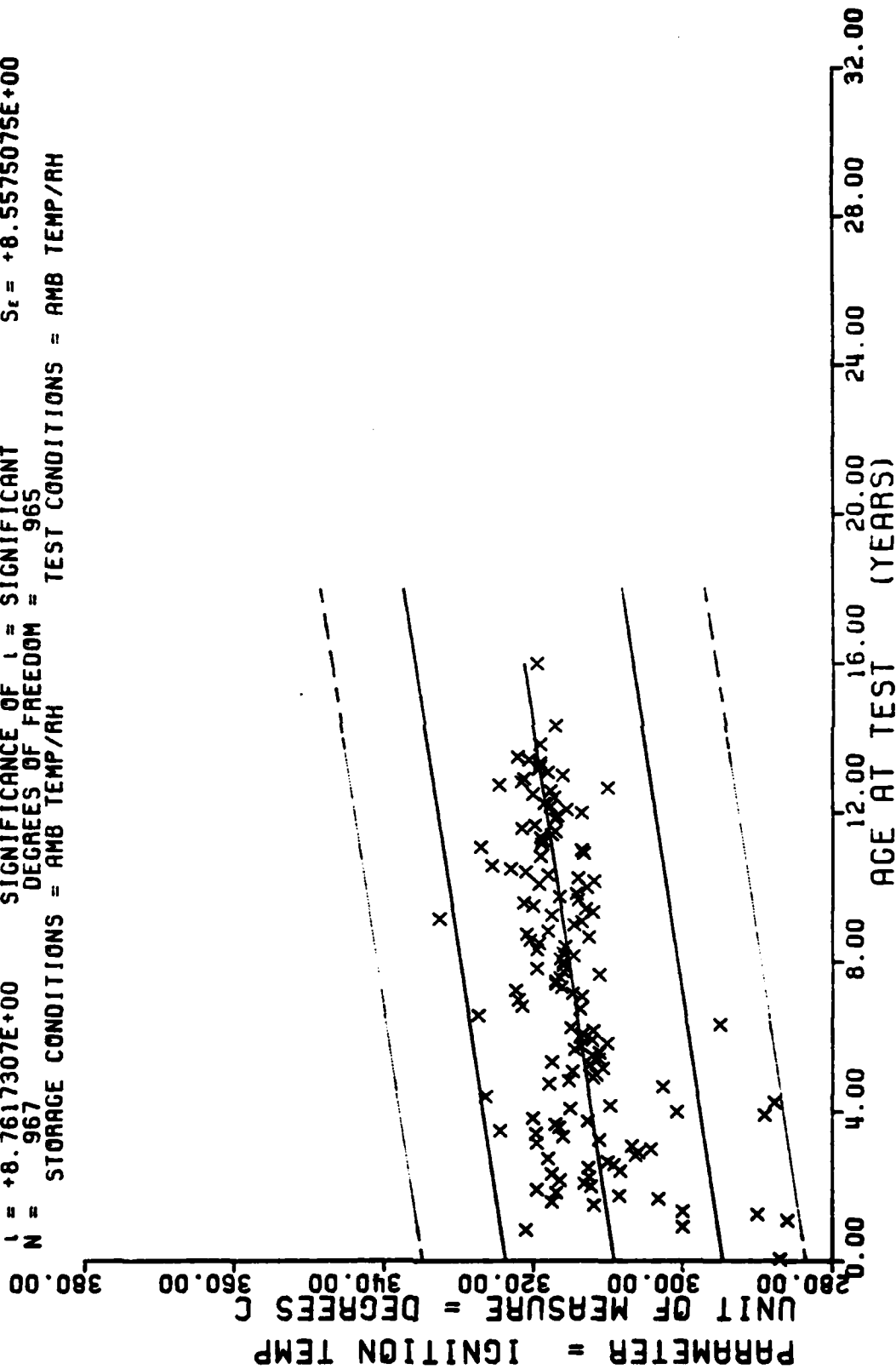
Figure 64

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
1	3	37	13	65	14	95	7	125	2
10	1	38	4	66	23	96	4	126	4
11	1	39	7	67	34	97	6	127	2
13	1	40	5	68	20	98	4	130	4
15	1	41	17	69	16	99	5	131	6
16	1	42	5	70	31	100	2	132	8
18	7	43	2	71	10	101	2	133	5
19	2	44	2	72	8	102	5	134	4
20	4	45	3	73	12	103	8	135	4
21	4	46	3	75	2	104	11	136	4
22	20	47	1	76	1	105	4	138	2
23	4	48	4	79	6	106	4	139	4
24	4	49	3	81	8	108	2	140	2
25	6	50	3	82	2	109	2	142	8
26	14	51	3	84	2	110	2	143	2
27	2	53	3	85	4	111	2	145	2
28	4	56	3	86	8	114	2	146	6
29	14	57	9	87	3	115	4	147	6
30	12	58	4	88	6	117	2	149	6
31	10	59	13	89	2	118	4	150	4
32	2	60	18	90	4	120	8	151	6
33	6	61	23	91	3	121	14	153	2
34	10	62	21	92	2	122	16	154	2
35	9	63	32	93	2	123	4	155	6
36	22	64	23	94	4	124	2	156	2

IGTA IGNITION TEMPERATURE, 9 DEGREE C RISE/MINUTE

This sample size summary is applicable to figure 65

$F = +7.6767925E+01$ SIGNIFICANCE OF F = $(+6.2661905E-02) \times X$
 $R = +2.7145910E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $L = +8.7617307E+00$ SIGNIFICANCE OF L = SIGNIFICANT
 $N = 967$ DEGREES OF FREEDOM = 965
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



STAGE I WING 6 TGA IGNITION TEMPERATURE, 9 DEGREE C RISE/MINUTE

Figure 65

[illegible]

SAGE I	WING 6	TGA	% WT LOSS AT 250 DEG C HCLD.	12 DEG RISE/MIN TO HOLD
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9
10	10	10	10	10
11	11	11	11	11
12	12	12	12	12
13	13	13	13	13
14	14	14	14	14
15	15	15	15	15
16	16	16	16	16
17	17	17	17	17
18	18	18	18	18
19	19	19	19	19
20	20	20	20	20
21	21	21	21	21
22	22	22	22	22
23	23	23	23	23
24	24	24	24	24
25	25	25	25	25
26	26	26	26	26
27	27	27	27	27
28	28	28	28	28
29	29	29	29	29
30	30	30	30	30
31	31	31	31	31
32	32	32	32	32
33	33	33	33	33
34	34	34	34	34
35	35	35	35	35
36	36	36	36	36
37	37	37	37	37
38	38	38	38	38
39	39	39	39	39
40	40	40	40	40
41	41	41	41	41
42	42	42	42	42
43	43	43	43	43
44	44	44	44	44
45	45	45	45	45
46	46	46	46	46
47	47	47	47	47
48	48	48	48	48
49	49	49	49	49
50	50	50	50	50
51	51	51	51	51
52	52	52	52	52
53	53	53	53	53
54	54	54	54	54
55	55	55	55	55
56	56	56	56	56
57	57	57	57	57
58	58	58	58	58
59	59	59	59	59
60	60	60	60	60
61	61	61	61	61
62	62	62	62	62
63	63	63	63	63
64	64	64	64	64
65	65	65	65	65
66	66	66	66	66
67	67	67	67	67
68	68	68	68	68
69	69	69	69	69
70	70	70	70	70
71	71	71	71	71
72	72	72	72	72
73	73	73	73	73
74	74	74	74	74
75	75	75	75	75
76	76	76	76	76
77	77	77	77	77
78	78	78	78	78
79	79	79	79	79
80	80	80	80	80
81	81	81	81	81
82	82	82	82	82
83	83	83	83	83
84	84	84	84	84
85	85	85	85	85
86	86	86	86	86
87	87			

This sample size summary is applicable to figure 66

$Y = ((+2.1109818E+01) + (+2.3520544E-02) \times X)$
 $F = +2.5304005E+01$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +2.1782474E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +5.0303087E+00$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 510$ DEGREES OF FREEDOM = 508
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = 12 DEG R/M TOLHD
 $G_r = +4.1349292E+00$
 $S_o = +4.6757655E-03$
 $S_r = +4.0396110E+00$

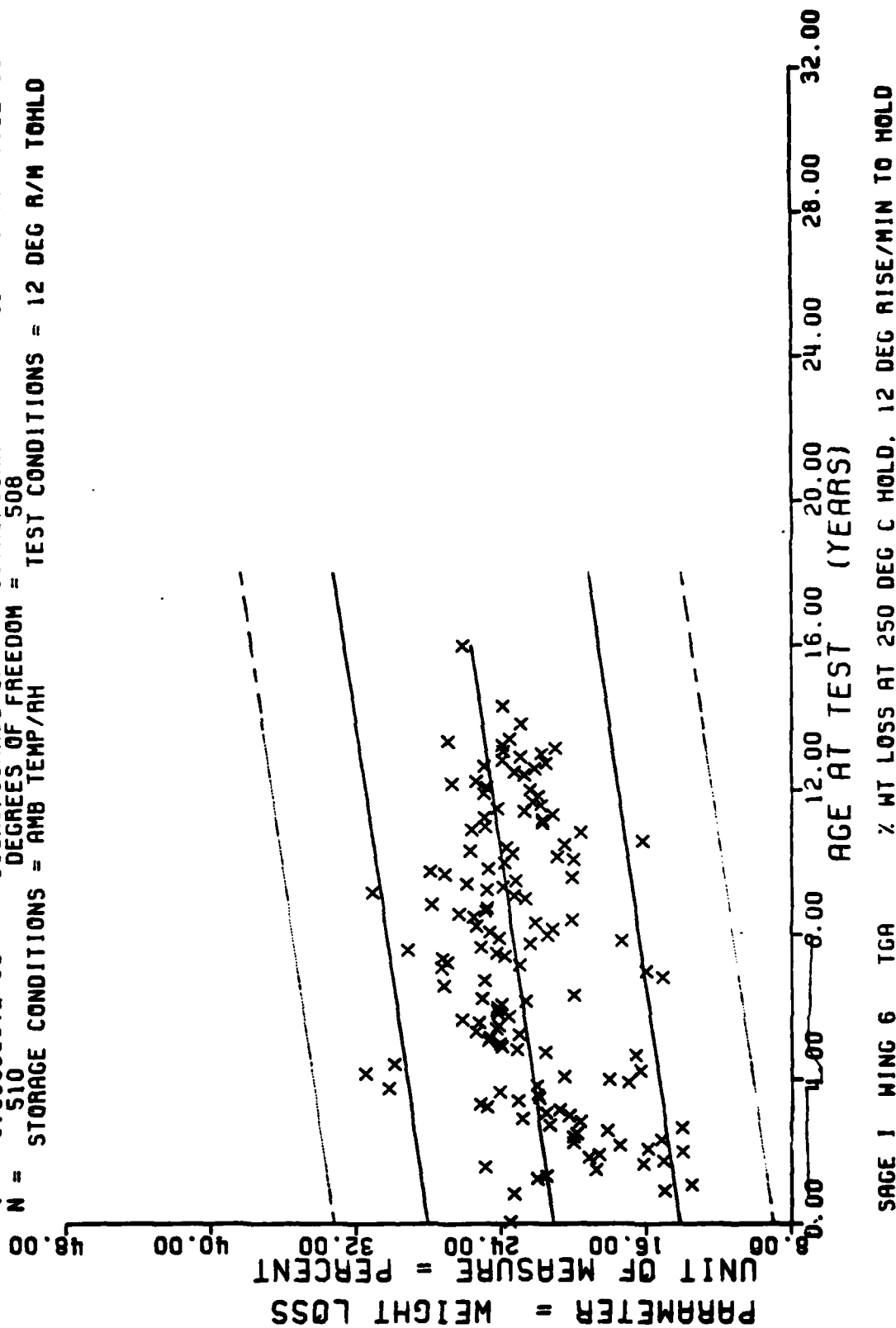


Figure 66

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
1	3	37	12	65	14	95	7	125	2	157	2
10	1	38	4	66	23	96	4	126	4	158	4
11	1	39	5	67	34	97	5	127	2	161	2
13	1	40	4	68	20	98	4	130	4	162	4
15	1	41	17	69	16	99	4	131	6	166	6
16	1	42	5	70	31	100	2	132	8	172	2
18	7	43	2	71	10	101	2	133	5	192	2
19	2	44	2	72	8	102	5	134	4		
20	4	45	2	73	12	103	7	135	4		
21	4	46	3	75	2	104	9	136	4		
22	20	47	1	76	1	105	4	138	2		
23	4	48	4	79	6	106	4	139	4		
24	4	49	3	81	8	108	2	140	2		
25	6	50	2	82	2	109	2	142	8		
26	14	51	3	84	2	110	2	143	2		
27	2	53	3	85	4	111	2	145	2		
28	4	56	3	86	8	114	2	146	6		
29	14	57	9	87	3	115	4	147	6		
30	12	58	4	88	6	117	2	149	6		
31	10	59	13	89	2	118	4	150	4		
32	2	60	18	90	4	120	8	151	6		
33	6	61	23	91	3	121	14	153	2		
34	10	62	21	92	2	122	16	154	2		
35	9	63	32	93	2	123	4	155	6		
36	22	64	23	94	4	124	2	156	2		

TGA PERCENT WEIGHT LOSS AT IGNITION, 9 DEG C RISE/MIN

This sample size summary is applicable to figure 67

$Y = ((+3.4868048E+01) + (+3.7280541E-02) \times X)$
 $F = +6.4801664E+01$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +2.5257398E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $I = +8.0499480E+00$ SIGNIFICANCE OF I = SIGNIFICANT
 $N = 953$ DEGREES OF FREEDOM = 951
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 9 DEG C RISE/MIN

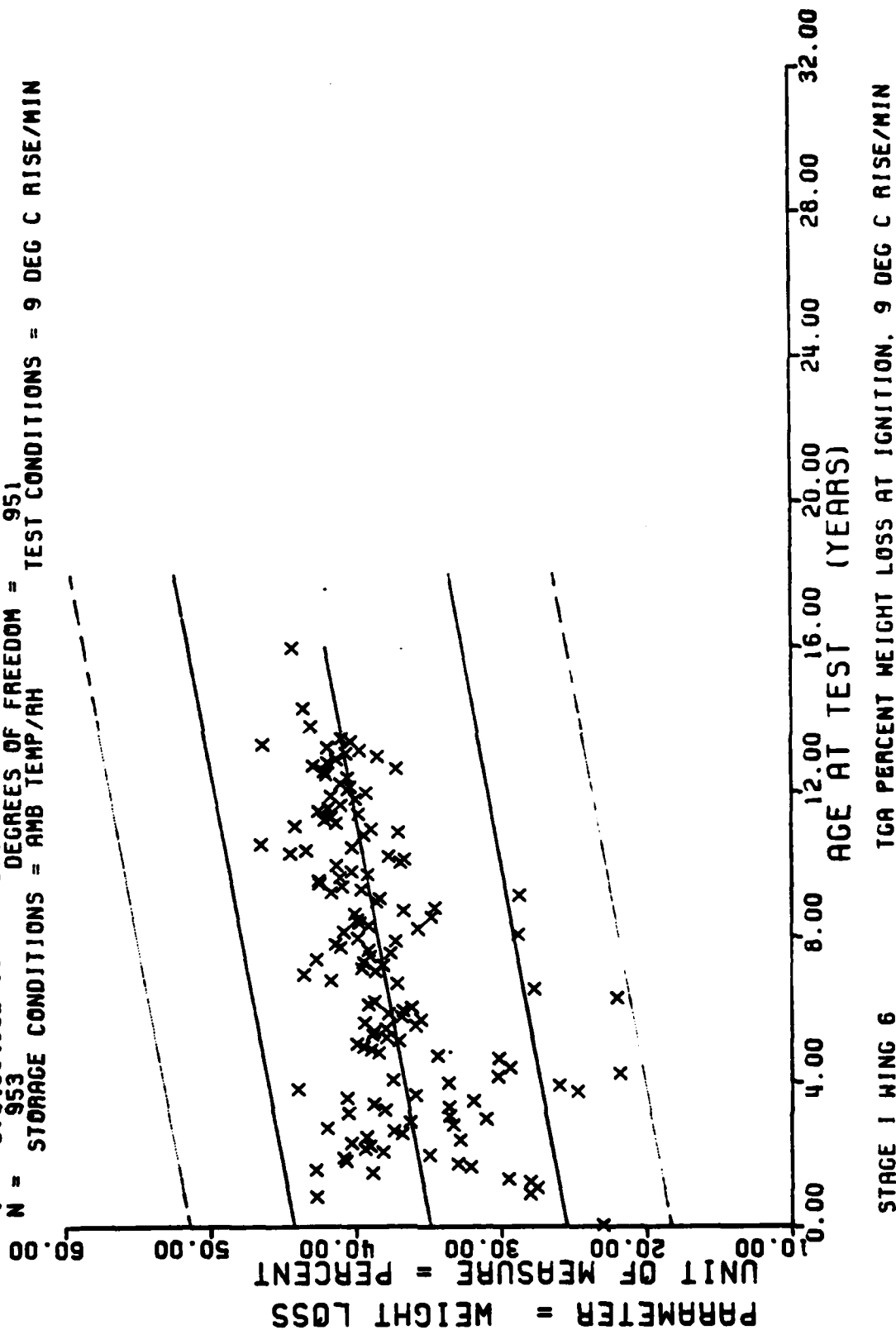


Figure 67

*** SAMPLE SIZE SUMMARY ***

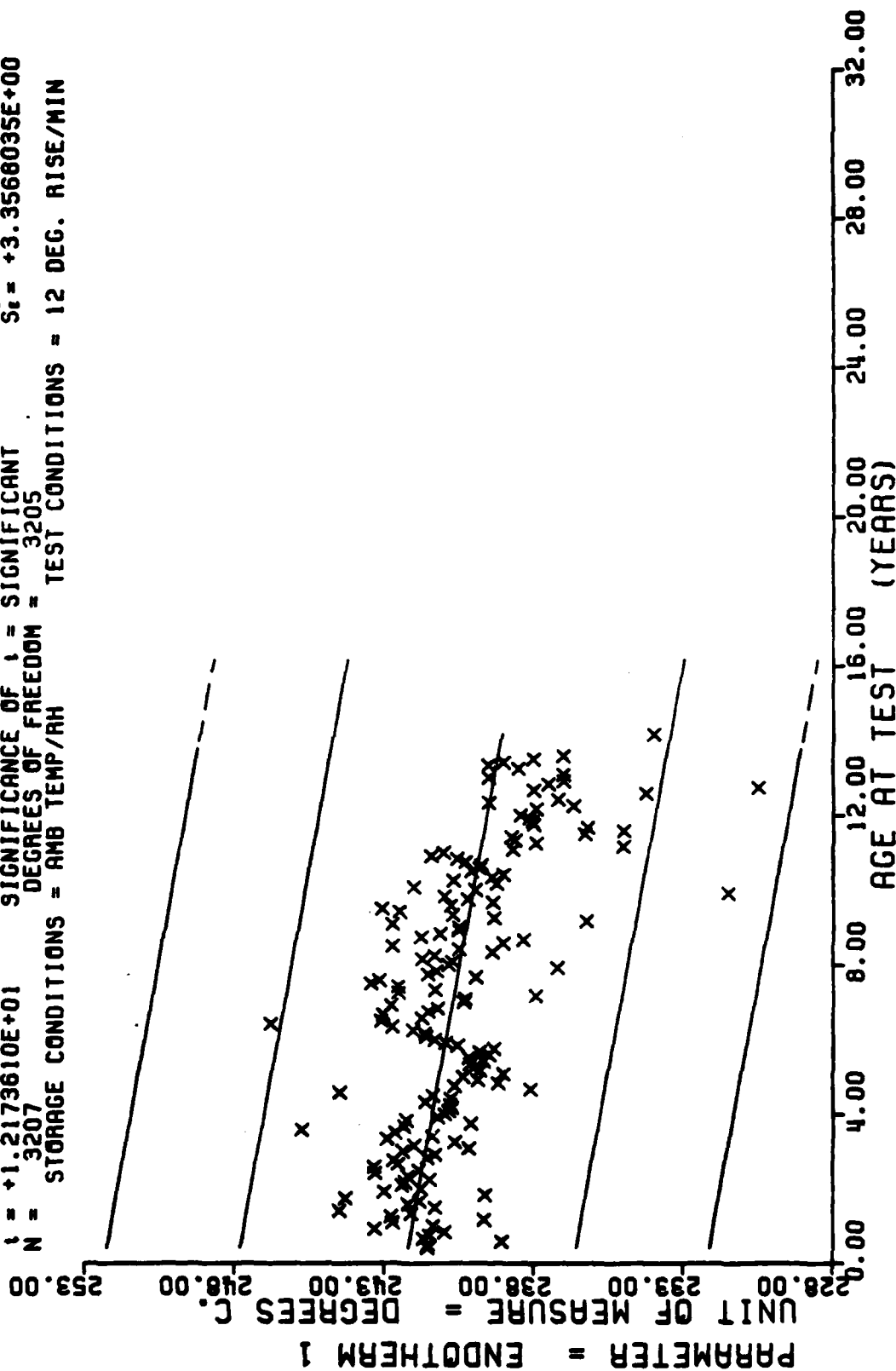
AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
5	9	30	29	55	15	80	34	105	8	130	62	130	62
6	27	31	28	56	32	81	35	106	15	131	39	131	39
7	11	32	23	57	27	82	30	107	4	132	24	132	24
8	14	33	19	58	41	83	29	108	14	133	16	133	16
9	12	34	33	59	33	84	18	109	13	134	6	134	6
10	3	35	24	60	43	85	20	110	4	135	10	135	10
11	3	36	35	61	41	86	16	111	6	136	8	136	8
12	24	37	24	62	35	87	19	112	12	137	8	137	8
13	15	38	9	63	46	88	27	113	37	138	8	138	8
14	18	39	22	64	24	89	32	114	58	139	6	139	6
15	8	40	21	65	30	90	32	115	33	140	8	140	8
16	29	41	5	66	30	91	13	116	9	141	8	141	8
17	14	42	11	67	59	92	14	117	21	142	20	142	20
18	30	43	12	68	30	93	15	118	42	143	40	143	40
19	10	44	6	69	40	94	15	119	2	144	14	144	14
20	11	45	9	70	68	95	17	120	14	145	8	145	8
21	24	46	15	71	48	96	31	121	12	146	6	146	6
22	16	47	47	72	18	97	41	122	13	147	14	147	14
23	13	48	41	73	27	98	34	123	3	148	4	148	4
24	9	49	38	74	15	99	27	124	10	149	2	149	2
25	27	50	27	75	21	100	20	125	17	150	2	150	2
26	27	51	22	76	18	101	15	126	17	151	6	151	6
27	27	52	27	77	9	102	10	127	3	152	2	152	2
28	25	53	33	78	22	103	18	128	23	153	5	153	5
29	27	54	10	79	26	104	17	129	11	154	2	154	2
										155	2	155	2
										156	2	156	2
										157	2	157	2
										158	2	158	2
										159	2	159	2
										160	2	160	2
										161	2	161	2
										162	2	162	2
										163	2	163	2

STAGE 1 WING 6. TC-H 1011. CTA. EXOTHERM 1. 12 DEGREE CENTIGRADE RISE/MIN

This sample size summary is applicable to figures 68 and 69

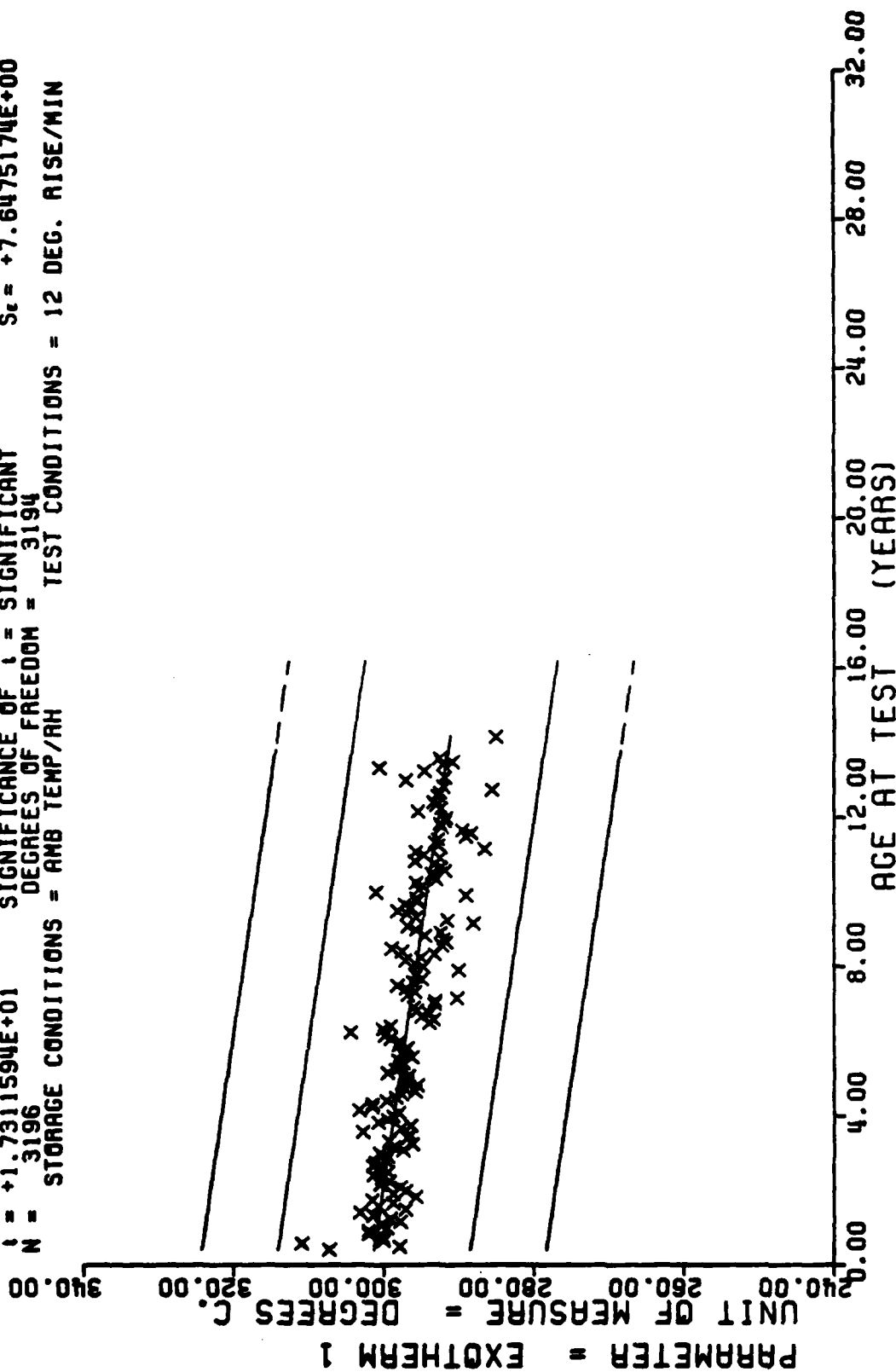
170

$F = +1.4819678E+02$ SIGNIFICANCE OF $F =$ SIGNIFICANT $G_r = +3.4329990E+00$
 $R = -2.1022766E-01$ SIGNIFICANCE OF $R =$ SIGNIFICANT $S_e = +1.5665614E-03$
 $t = +1.2173610E+01$ SIGNIFICANCE OF $t =$ SIGNIFICANT $S_e = +3.3568035E+00$
 $N = 3207$ DEGREES OF FREEDOM = 3205
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 12 DEG. RISE/MIN



STAGE 1 WING 6. TP-H 1011. OTA, ENDOTHERM 1. 12 DEGREE CENTIGRADE RISE/MIN

$Y = (1 + 3.0158646E+02) + (-6.1814723E-02) \times X$
 $F = +2.9969129E+02$ SIGNIFICANCE OF F = SIGNIFICANT $\sigma = +7.9970038E+00$
 $R = -2.9286342E-01$ SIGNIFICANCE OF R = SIGNIFICANT $S_e = +3.5707123E-03$
 $t = +1.7311594E+01$ SIGNIFICANCE OF t = SIGNIFICANT $S_e = +7.6475174E+00$
 $N = 3196$ DEGREES OF FREEDOM = 3194
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 12 DEG. RISE/MIN



STAGE 1 WING 6, TP-H 1011, DTA, EXOTHERM 1, 12 DEGREE CENTIGRADE RISE/MIN

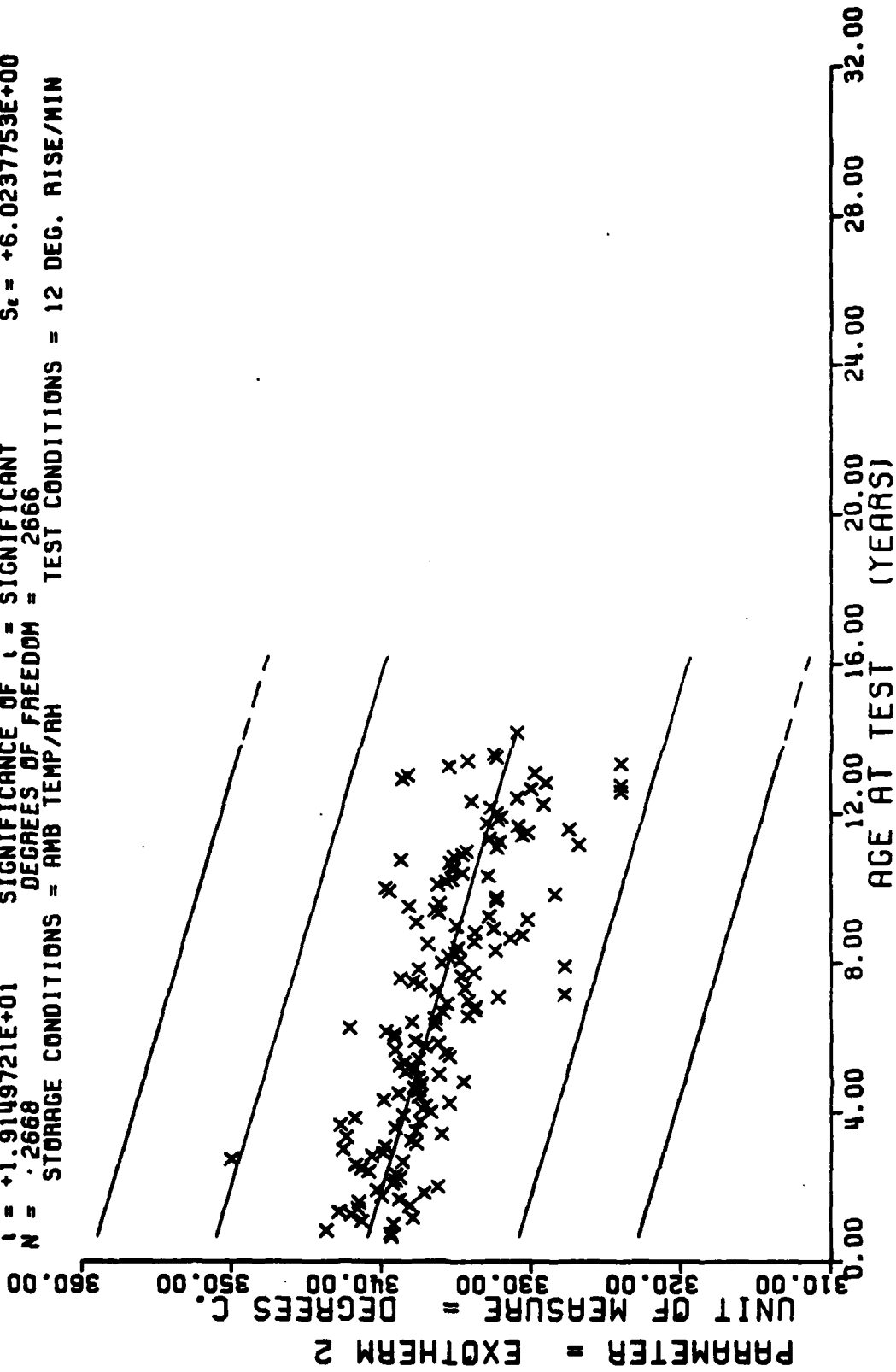
Figure 69

[illegible]

STAGE 1 WING 6, TP-H 1011, OTA, EXOTHERM 2, 12 DEGREE CENTIGRADE RISE/MIN

This sample size summary is applicable to figure 70

$Y = ((+3.4138943E+02) + (-6.0979802E-02) * X)$
 $F = +3.6671182E+02$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = -3.4773378E-01$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +1.9149721E+01$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = .2668$ DEGREES OF FREEDOM = 2666
 STORAGE CONDITIONS = AMB TEMP/AM TEST CONDITIONS = 12 DEG. RISE/MIN



STAGE 1 WING 6, TP-H 1011, DTA, EXOTHERM 2, 12 DEGREE CENTIGRADE RISE/MIN

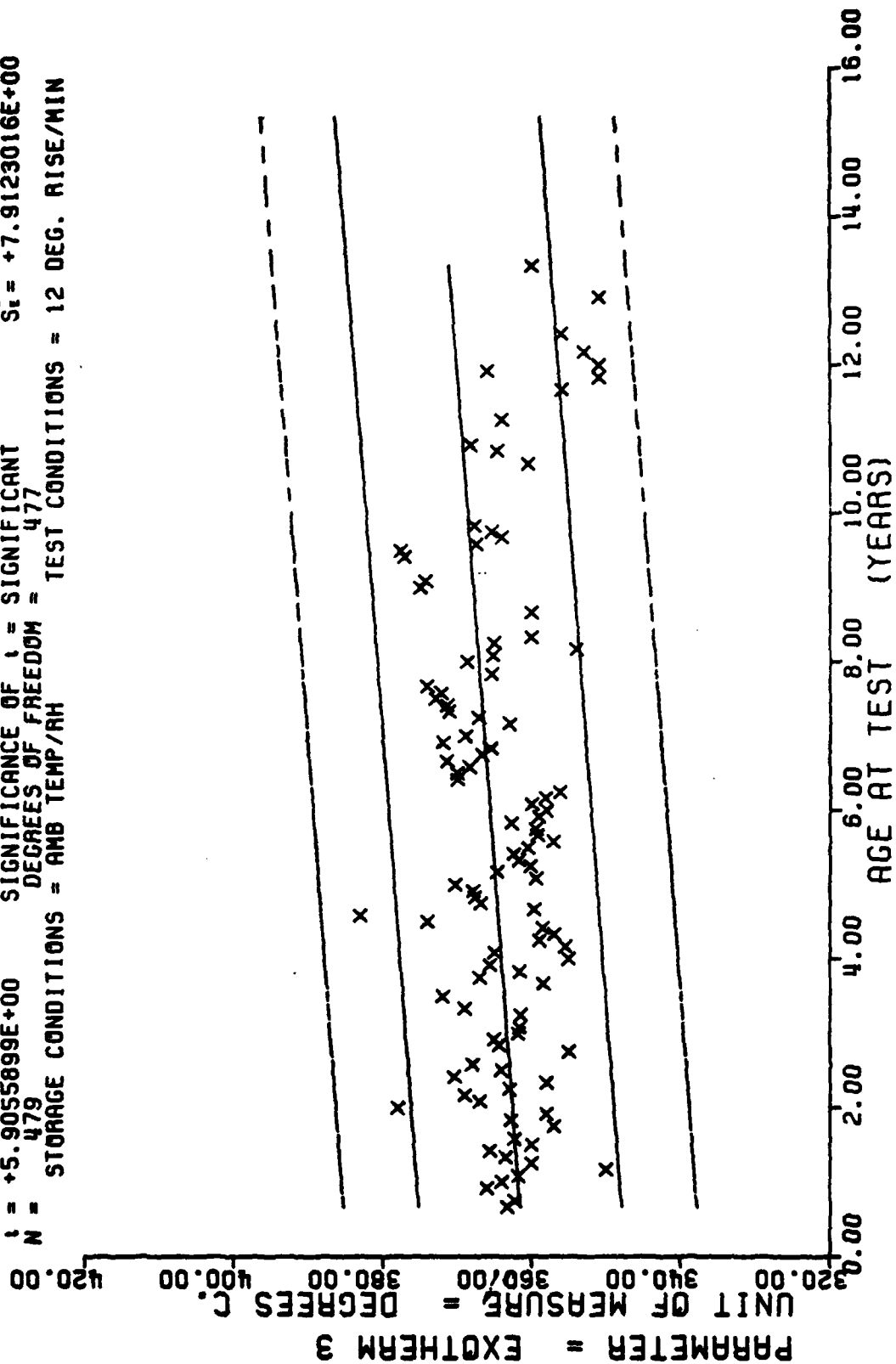
Figure 70

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
8	3	36	4	64	4	91	6	144	1
9	7	37	5	65	7	92	2	146	1
11	3	39	2	66	4	94	3	149	1
12	4	40	5	67	9	96	6	155	1
13	5	42	3	68	4	97	4	160	1
14	3	44	2	69	7	98	1		
15	1	45	1	70	3	99	1		
16	4	46	5	71	2	100	1		
17	5	47	7	72	4	104	1		
18	5	48	8	73	4	108	3		
19	6	49	2	74	6	109	4		
21	2	50	2	75	8	110	1		
22	4	51	1	77	1	113	11		
23	1	52	3	78	3	114	21		
24	1	53	4	79	18	115	7		
25	1	54	1	80	12	116	2		
26	2	55	1	81	10	117	3		
27	4	56	3	82	8	118	3		
28	3	57	7	83	8	128	2		
29	5	58	5	84	7	130	5		
30	9	59	7	86	1	131	4		
31	4	60	4	87	8	135	3		
33	4	61	7	88	8	140	1		
34	5	62	6	89	16	142	2		
35	4	63	5	90	12	143	4		

STAGE 1 WING 6. TP-H 1011. ETA. EXCISE 3. 12 DEGREE CENTIGRADE RISE/MIN

This sample size summary is applicable to figure 71

$F = +3.4875992E+01$
 $R = +2.6102427E-01$
 $t = +5.9055899E+00$
 $N = 479$
 $Y = ((+3.6107042E+02) + (+6.3001657E-02) \times X)$
 SIGNIFICANCE OF F = SIGNIFICANT
 SIGNIFICANCE OF R = SIGNIFICANT
 SIGNIFICANCE OF t = SIGNIFICANT
 DEGREES OF FREEDOM = 477
 STORAGE CONDITIONS = AMB TEMP/AM
 TEST CONDITIONS = 12 DEG. RISE/MIN



STAGE 1 WING 6, TP-H 1011, OIA, EXOTHERM 3, 12 DEGREE CENTIGRADE RISE/MIN

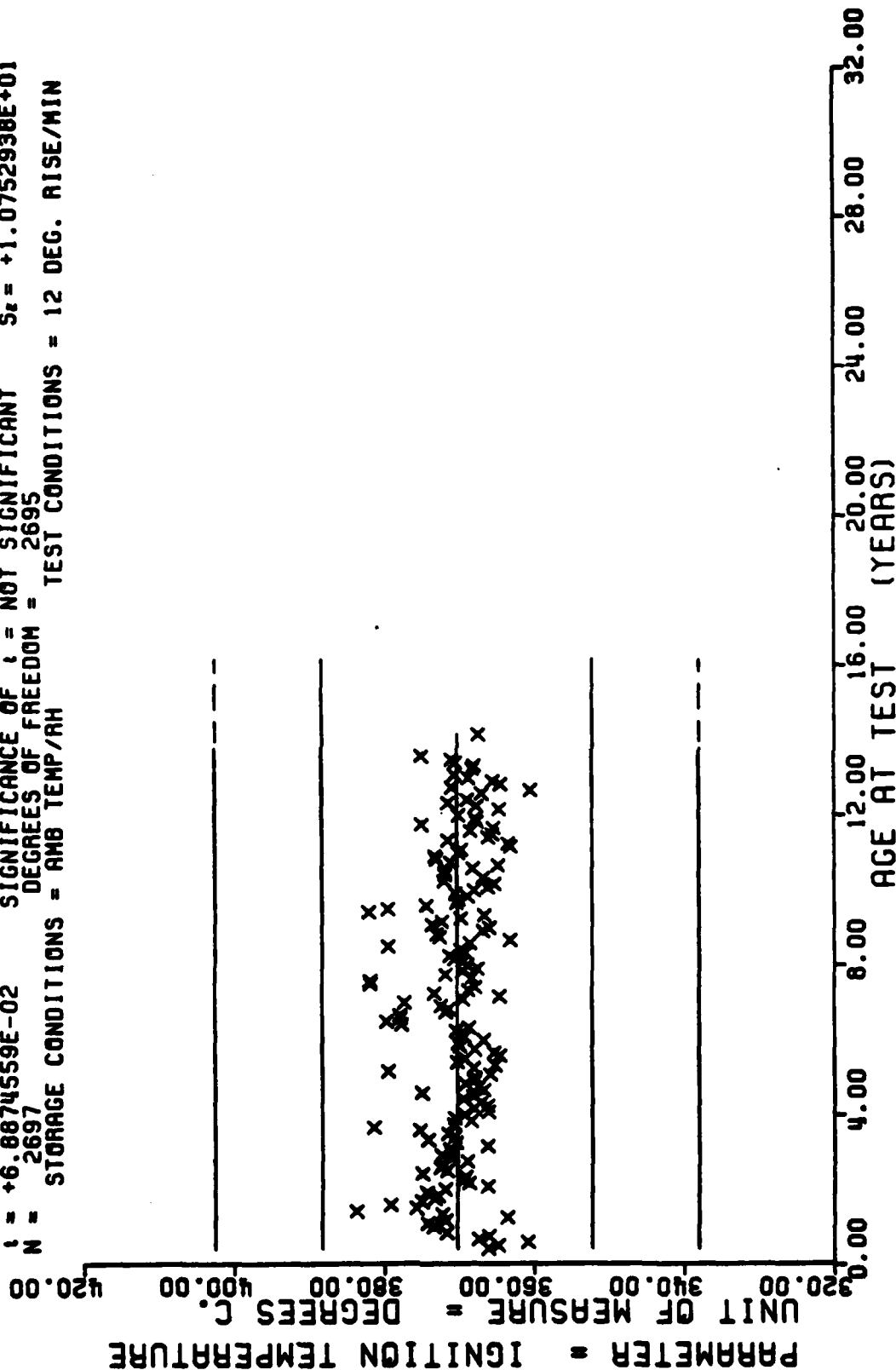
Figure 71

[illegible]

	STAGE I WING	6.	TP-H	I-11.	OTA,	IGNITION TEMPERATURE,	12 DEGREE	CENT.	RISE/MIN
									170

This sample size summary is applicable to figure 72

$Y = ((+3.7024329E+02) + (+3.7164211E-04) \times X)$
 $F = +4.7437049E-03$ SIGNIFICANCE OF F = NOT SIGNIFICANT $\sigma_f = +1.0750953E+01$
 $R = +1.3267193E-03$ SIGNIFICANCE OF R = NOT SIGNIFICANT $S_o = +5.3959273E-03$
 $t = +6.8874559E-02$ SIGNIFICANCE OF t = NOT SIGNIFICANT $S_e = +1.0752938E+01$
 $N = 2697$ DEGREES OF FREEDOM = 2695
 STORAGE CONDITIONS = AMB TEMP/12 DEG. RISE/MIN
 TEST CONDITIONS = 12 DEG. RISE/MIN



STAGE 1 WING 6, TP-H 1011, DIA, IGNITION TEMPERATURE, 12 DEGREE CENT. RISE/MIN

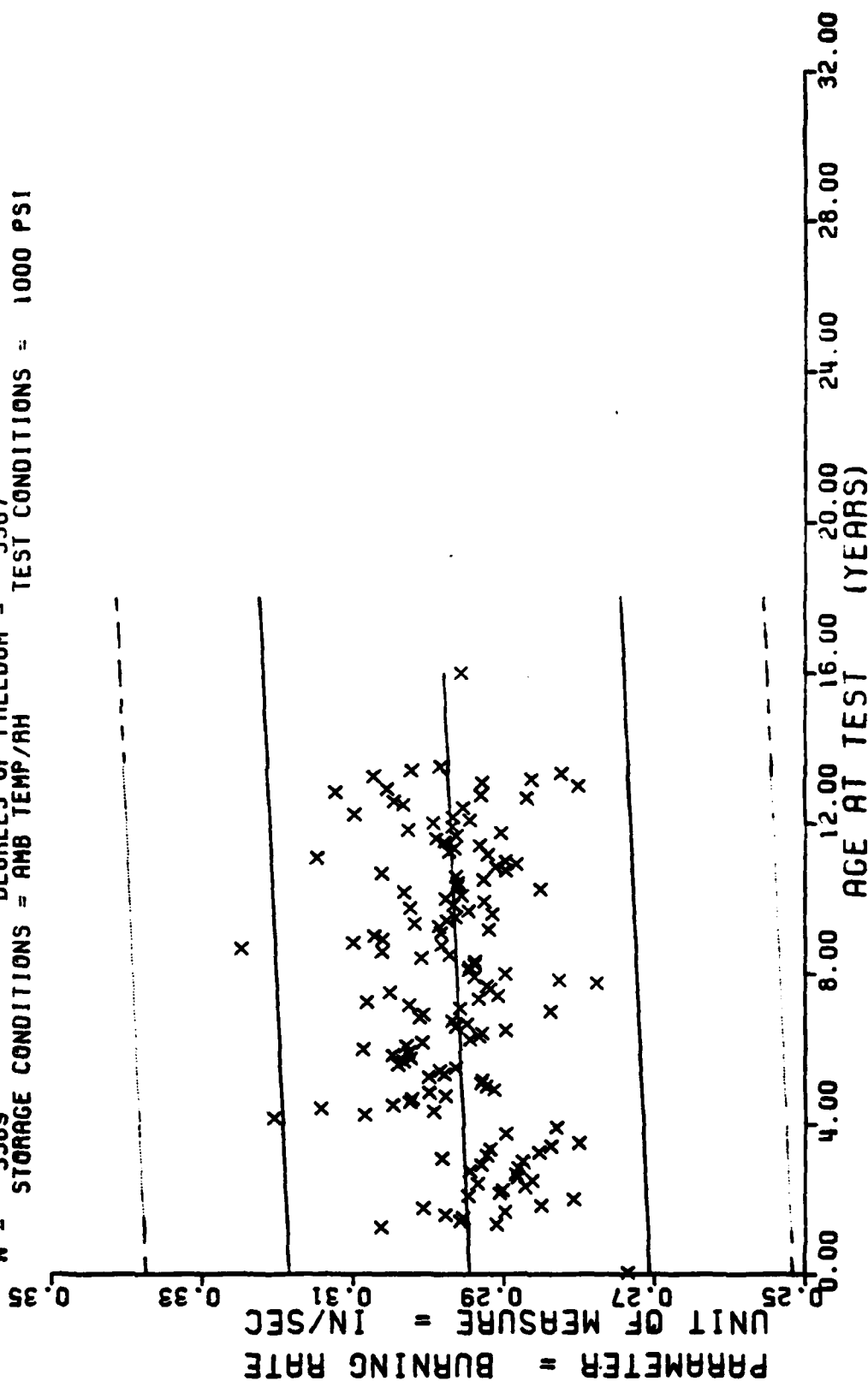
*** SAMPLE SIZE SUMMARY ***

AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP	AGE (MOS)	NR SAMP
1	2	40	33	70	33	95	20	121	27	146	36		
15	3	41	6	71	25	96	24	122	21	147	12		
16	9	42	19	72	54	97	24	123	9	149	9		
17	15	45	3	73	50	98	35	124	5	150	9		
18	12	47	9	74	74	99	35	125	6	151	9		
19	12	50	12	75	69	100	22	126	12	152	6		
20	18	51	12	76	36	101	8	127	22	154	6		
21	3	52	22	77	21	102	18	128	12	155	3		
22	3	53	24	78	8	103	6	129	39	156	3		
24	3	54	26	79	39	104	9	130	54	157	3		
25	3	55	24	80	15	105	9	131	86	158	6		
26	8	56	17	81	34	107	6	132	24	159	3		
27	24	57	27	82	24	108	6	133	17	162	2		
28	27	58	45	83	15	109	5	134	15	192	3		
29	46	59	42	84	9	110	3	135	24				
30	18	60	44	85	18	111	15	136	15				
31	42	61	33	86	12	112	14	137	9				
32	31	62	67	87	6	113	18	138	9				
33	43	63	51	88	15	114	54	139	50				
34	29	64	50	89	16	115	55	140	24				
35	43	65	37	90	28	116	22	141	27				
36	50	66	15	91	19	117	24	142	18				
37	24	67	24	92	26	118	28	143	12				
38	19	68	30	93	9	119	27	144	30				
39	21	69	27	94	6	120	79	145	27				

STAGE I WING 6 TD-HIC11 BURNING PAT AT 1000 PSI

This sample size summary is applicable to figure 73

$Y = ((+2.9452641E-01) + (1 + 1.7900472E-05) * X)$
 $F = +7.3401245E+00$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = +4.6639865E-02$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +2.7092664E+00$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 3369$ DEGREES OF FREEDOM = 3367
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = 1000 PSI



STAGE I WING 6 TP-H1011 BURNING RATE AT 1000 PSI

Figure 73

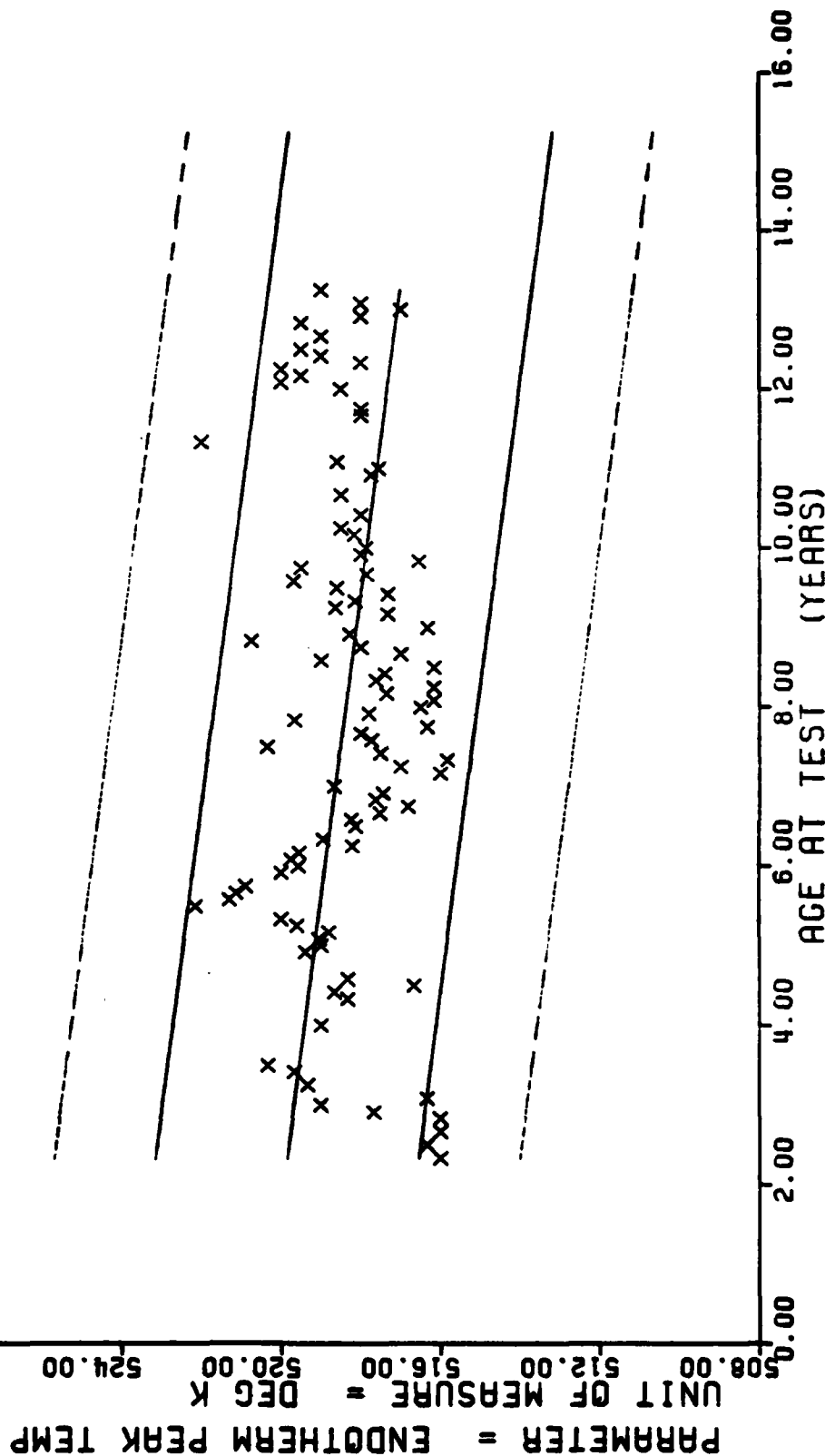
*** SAMPLE SIZE SUMMARY ***

AGF (MDS)	NP SAMP	AGF (MDS)	NR SAMP	AGF (MDS)	NP SAMP	AGF (MDS)	NP SAMP
28	6	71	17	98	14	128	2
30	3	72	16	99	18	131	8
32	2	73	21	100	8	132	54
34	2	74	11	101	5	133	5
35	3	75	14	102	6	136	2
36	7	76	20	103	3	140	2
37	3	78	30	104	7	141	2
39	6	79	42	105	8	144	2
41	3	80	56	106	4	145	2
42	3	81	42	107	7	146	2
48	3	82	32	108	3	147	2
52	3	83	50	110	3	148	2
53	3	84	3	111	34	149	2
54	3	86	5	112	13	150	2
55	3	87	2	113	6	152	2
59	10	88	6	114	13	154	2
60	18	89	2	115	23	155	2
61	21	90	3	116	14	156	5
62	15	91	15	117	6	157	2
63	5	92	5	118	44	159	2
64	3	93	6	119	22		
66	14	94	3	120	8		
67	54	95	5	122	6		
68	78	96	12	123	2		
69	36	97	6	125	2		

STAGE 1 WING 6 DIFFERENTIAL SCANNING CALORIMETED EXOTHERM 2 PEAK TEMP

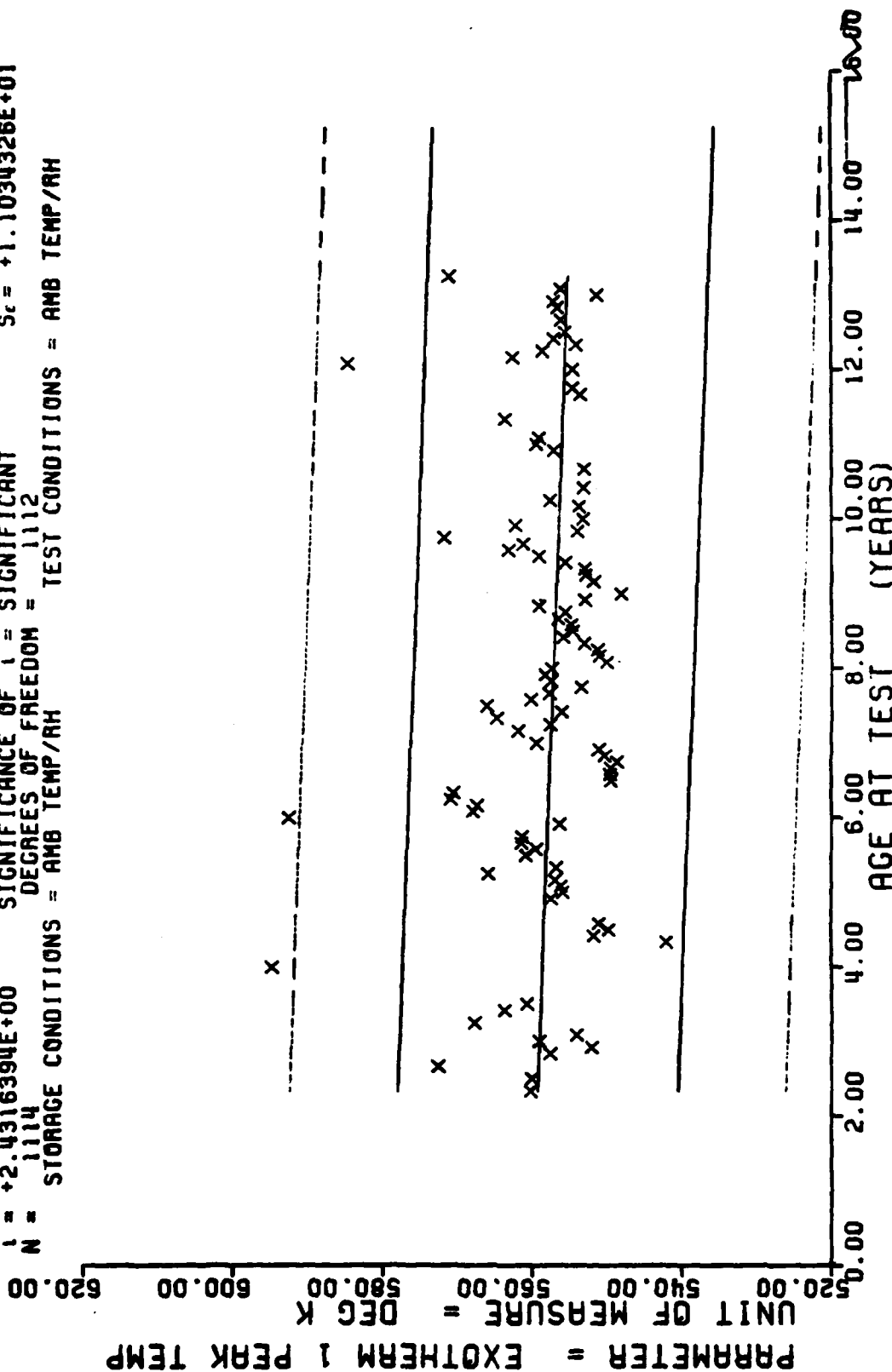
This sample size summary is applicable to figures 74 thru 76

$Y = (1 + 5.2045459E+02) + (-2.1667973E-02) \times X$
 F = +8.9936583E+01 SIGNIFICANCE OF F = SIGNIFICANT $\sigma_1 = +2.0230013E+00$
 R = -2.7354414E-01 SIGNIFICANCE OF R = SIGNIFICANT $S_0 = +2.2848100E-03$
 I = +9.4834900E+00 SIGNIFICANCE OF I = SIGNIFICANT $S_1 = +1.9467177E+00$
 N = 1114 DEGREES OF FREEDOM = 1112
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH



STAGE 1 WING 6 DIFFERENTIAL SCANNING CALORIMETER ENDOTHERM PEAK TEMP

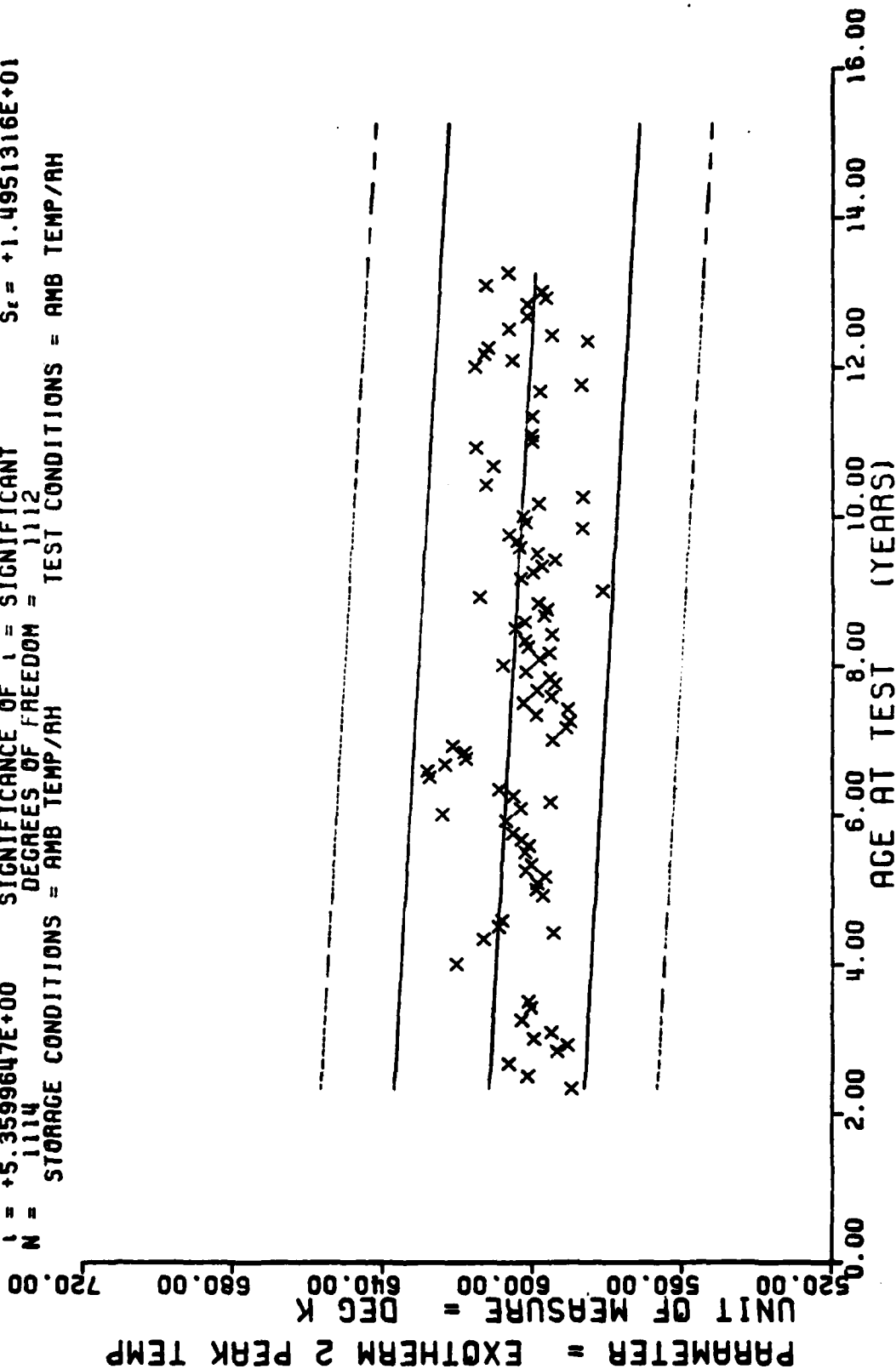
$Y = ((+5.6008078E+02) + (-3.1491413E-02) * X)$
 $F = +5.9128705E+00$ SIGNIFICANCE OF F = SIGNIFICANT
 $R = -7.2726922E-02$ SIGNIFICANCE OF R = SIGNIFICANT
 $t = +2.4316394E+00$ SIGNIFICANCE OF t = SIGNIFICANT
 $N = 1114$ DEGREES OF FREEDOM = 1112
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



STAGE 1 WING 6 DIFFERENTIAL SCANNING CALORIMETER EXOTHERM 1 PEAK TEMP

Figure 75

$F = +2.8729222E+01$
 $R = -1.5869770E-01$
 $I = +5.3599647E+00$
 $N = 1114$
 $Y = ((+6.1417125E+02) + (-9.4056431E-02) \times X)$
 SIGNIFICANCE OF F = SIGNIFICANT
 SIGNIFICANCE OF R = SIGNIFICANT
 SIGNIFICANCE OF I = SIGNIFICANT
 DEGREES OF FREEDOM = 1112
 STORAGE CONDITIONS = AMB TEMP/AH
 TEST CONDITIONS = AMB TEMP/AH



STAGE I WING 6 DIFFERENTIAL SCANNING CALORIMETER EXOTHERM 2 PEAK TEMP

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1. REPORT NUMBER MANCP Report Nr 445(80)	2. GOVT ACCESSION NO. AD-A092	3. RECIPIENT'S CATALOG NUMBER 765
4. TITLE (and Subtitle) Propellant Surveillance Report, LGM-30 F & G Stage I, Phase G, Series VIII, TP-H1011, (E)	5. TYPE OF REPORT & PERIOD COVERED Test Results - semi annual	
6. AUTHORING (10) John A. Thompson	7. CONTRACT OR GRANT NUMBER(s) (11) Ozt 80	
8. PERFORMING ORGANIZATION NAME AND ADDRESS Propellant Analysis Laboratory Directorate of Maintenance OO-ALC Hill AFB, Utah 84056 (12) 134	9. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS MMWRM Project M04046C- WNL01529	
10. CONTROLLING OFFICE NAME AND ADDRESS Service Engineering Division Directorate of Materiel Management OO-ALC Hill AFB, Utah 84056	11. REPORT DATE Oct 1980	
12. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) (9) Semi-annual test results,	13. NUMBER OF PAGES 136	
14. DISTRIBUTION STATEMENT (of this Report) Approved for Public Release, Distribution Unlimited		15. SECURITY CLASS. (of this report)
16. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
17. SUPPLEMENTARY NOTES		
18. KEY WORDS (Continue on reverse side if necessary and identify by block number) Solid Propellant Minuteman		
19. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report contains propellant test results from cartons of TP-H1011 bulk propellant representing LGM-30 F and G First Stage Minuteman Motors. This report uses a statistical approach to analyze the bulk carton propellant data. Testing was accomplished in accordance with MMWRM Project M04046-WNL01529. The data from this test period are combined with data from previous testing and entered into the G085 computer for storage, analysis and regression analysis. From the statistical analysis of all data tested to date (fourteen & 1/2 years for		

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F and G), significant degradation of the propellant does not appear likely for at least two years past the oldest data point.

Each point on the regression plot represents the mean of all samples at that particular age. The number of samples at each point is indicated on the sample size summary sheet on the page accompanying each regression plot or group of regression plots. The data range at any age can be found by suitable inquiry of the G085 system.

